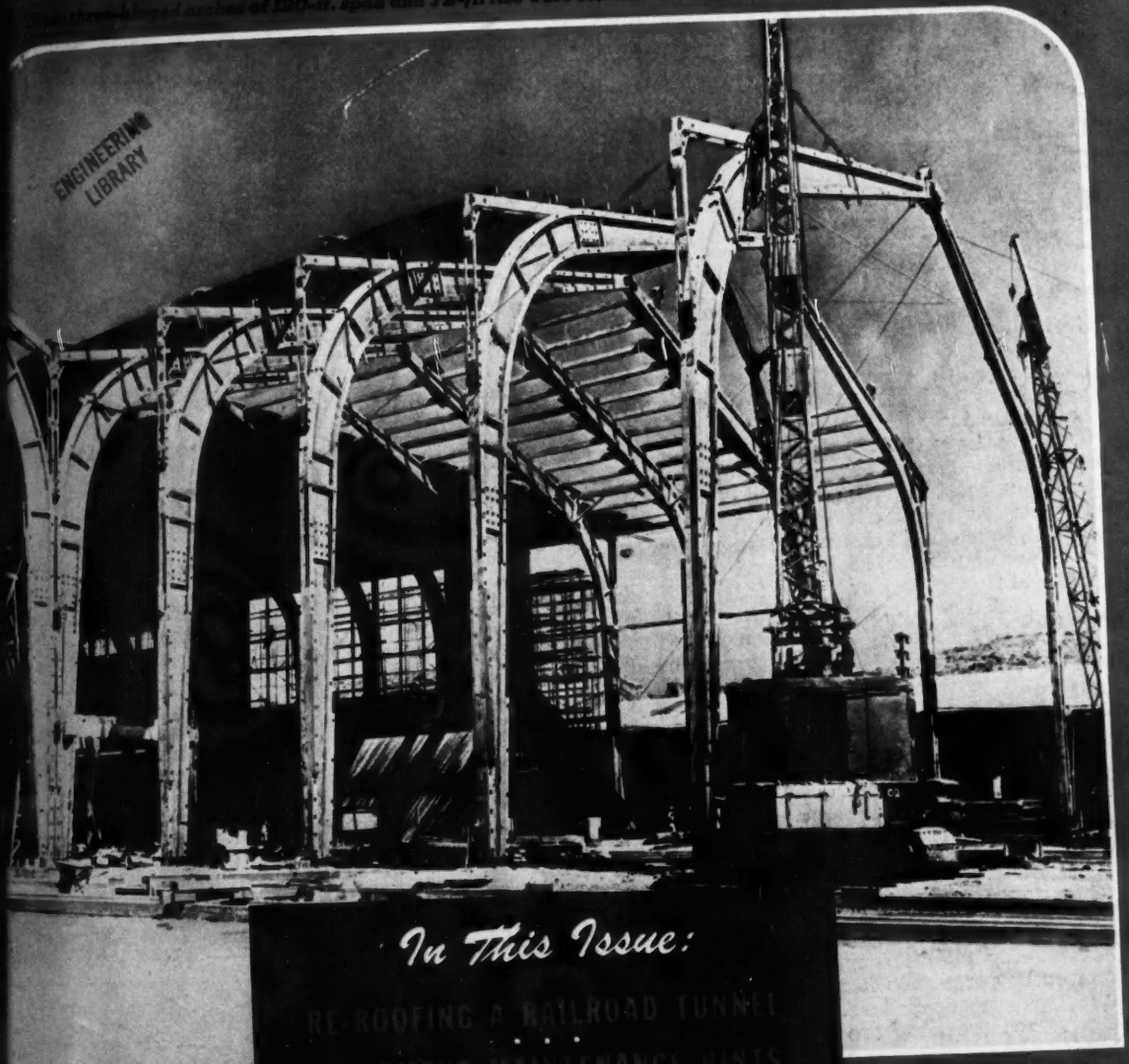
ENGINEERING NEWS-RECORD

FEBRUARY 22, 1945

Twin three-hinged arches of 150-ft. span and 72-ft. rise were constructed of glued laminated timber I-beams.



ENGINEERING LIBRARY

In This Issue:

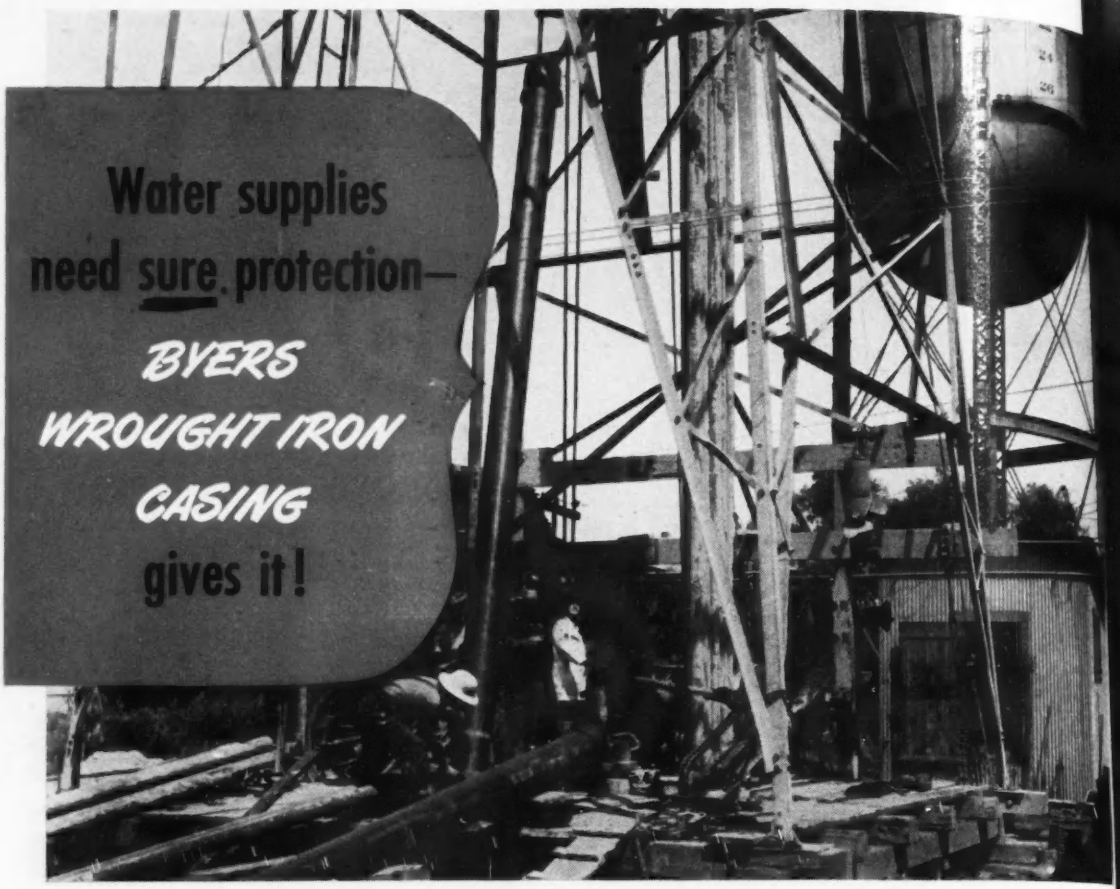
RE-ROOFING A RAILROAD TUNNEL

• • •

EQUIPMENT MAINTENANCE HINTS

• • •

REPAIRING STREETS WITH ASPHALT



Water supplies in hundreds of municipalities and industrial plants have been increasingly overtaxed for several years . . . and many have reached a point where something must be done about it. Within the past few months, two cities in Illinois, two in Ohio, one in Florida, and one in Michigan, have ordered wrought iron casing or piping for new installations . . . the Michigan municipality for 12 new artesian wells. Industrial plants in Massachusetts, Connecticut, New Jersey, Illinois and Arkansas have ordered wrought iron casing and drive pipe, water columns, and drill test well piping, while two railroads ordered wrought iron well casing and column pipe for new wells drilled in Texas.

This wide-spread use of wrought iron indicates engineering recognition of the supreme importance of a durable material. Premature failure may permit seepage that can endanger public health, and affect process operations. And of course replacements are difficult and costly.

The selection of wrought iron in so many different locations illustrates another very important point —the ability of the material to resist a wide variety of corrosive conditions from both soil and water. This has been confirmed over and over again by old records, which provide specifiers with a sound guide in selection.

For instance, a large meat packer in Nebraska installed wrought iron casing in a well drilled in 1914. In 1924, an increase in the flow line was required, and three lengths of low-first-cost material were used. In 1935, only 11 years later, it was found necessary to replace all three lengths . . . and at the same time an inspection of the 21-year old wrought iron casing revealed that it was still in excellent condition. Dozens of other examples could be cited, but this will illustrate the point.

There is every reason to consider wrought iron in any wells you are contemplating. Any increase in the first cost of the installation is slight . . . and is wiped out in the first few months of extra service. The material is available, even for wells on private property. And if the characteristics of the water are unknown, we will be glad to check on it for you, and tell you frankly what past experience indicates you can expect from wrought iron in the way of service. Our General Catalog will give you full dimensional information on pipe and casing; ask for a copy.

A. M. Byers Co., Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Chicago, St. Louis, Houston, Seattle, San Francisco.

CORROSION COSTS YOU MORE THAN WROUGHT IRON

BYERS
GENUINE WROUGHT IRON
TUBULAR AND HOT ROLLED PRODUCTS
ELECTRIC FURNACE ALLOY STEELS · OPEN HEARTH ALLOY STEELS
CARBON STEEL TUBULAR PRODUCTS

ENGINEERING NEWS-RECORD

oted to Buildings, Sewers, Waterworks, Bridges, Roads, Dams, Foundations, Earthwork, Flood Control, Public Works, Shipbuilding, Irrigation, Canals, Railroads

McGRAW-HILL PUBLISHING COMPANY, INC.

blication Office: 99-129 North Broadway, Albany 1, N. Y. • Editorial and Executive Offices: 330 West 42nd Street, New York 18

JOHN ABBINK, *Publisher*

WALDO G. BOWMAN, *Editor* ALBERT E. PAXTON, *Manager*

ol. 134 FEBRUARY 22, 1945 No. 8

COMING NEXT

The floating drydocks of the U. S. avy are among the War's new and otent weapons. They are new be- use of the units built are of types ot envisioned before the war. They re potent weapons, because these obile facilities enable us to plan aval strategy without dependence the availability of fixed bases. Our rgest battleships now can be lifted t of the water for repair at many laces throughout the Pacific. Their esign and construction, based on tudies and field observations at the 3 yards where they were built, will e described in a 24-page *ENR* re- ort, beginning in the March 8 ssue.

• A report by Waldo Bowman, *ENR* ditor, on the improvised piers in- talled at ports in the European heater of Operations, at which any hip afloat can unload it cargo, will e published in the March 8 issue. Of floating design, extensive use is ade of strings of 5 x 5 x 7-ft. steel ontoon cells. The units are assem- led and positioned by Navy Seabees nd held in position by pile dolphins onstructed by the Army Engineers, nd connected to the shore by Bailey ridge spans.

• "Toughest ground I ever saw", re- marked John R. Austin, speaking of conditions at the Leadville, Colo. drainage tunnel project. Among other handicaps, there were numerous fault zones, carrying water under 180-ft. head that had to be labori- ously traversed with extensive use of concrete lining carried along with the excavation, concrete bulkheads con- taining drainage systems, guniting, grouting and probing ahead with test holes. Oats were used to seal off small cracks while the grout set. Hot water in the grout mix counteracted 37-deg. temperature ground water. The project will be described in the March 8 issue.

LOOKING AHEAD

• A demountable, steel-frame "nose- in" hangar, 30 x 78 ft., which can be erected in 300 man-hours without the aid of cranes or derricks, has been developed by the Navy for aircraft maintenance work. The arches are identical, quick assembled of 8-ft. lengths of I-beams, all rib segments being interchangeable. A laminated- canvas cover "floating" on the steel framework provides a weather-tight enclosure. These, and other design and construction features, will be discussed in an early issue.

	PAGE
The Week in Engineering and Construction	53
Comments and Discussion	60
Editorials	62
Pioneer Design in Laminated Wood I-Beams.....S. B. BARNES	64
Water Storage for the Nation's Capital	67
Postwar Engineering and Construction Work in Brazil	69
Railroad Tunnel Roof Rebuilt from Shaft	70
Basin Cleaned by Electric Suction Dredge	74
Engineering Activities in France.....W. G. BOWMAN	79
Street Repair with City-Made Asphalt	86
Swedish Engineers Build 60-Mile Aerial Tramway	89
Earth Pressures in Retaining Wall Design.....C. H. LANG	90
Adding Years of Service to Equipment.....R. RALPH	93
Central Heating Plan for Entire Community	95
From Field and Office	96
Last Call for Postwar Truck Ballot	98
Elections and Activities	101
New Aids to the Constructor	104
Men and Jobs	108
Manufacturers' Activities	110
Construction Reports	155

Number of copies of this issue printed: 36,648

DO YOU WANT AN INDEX?

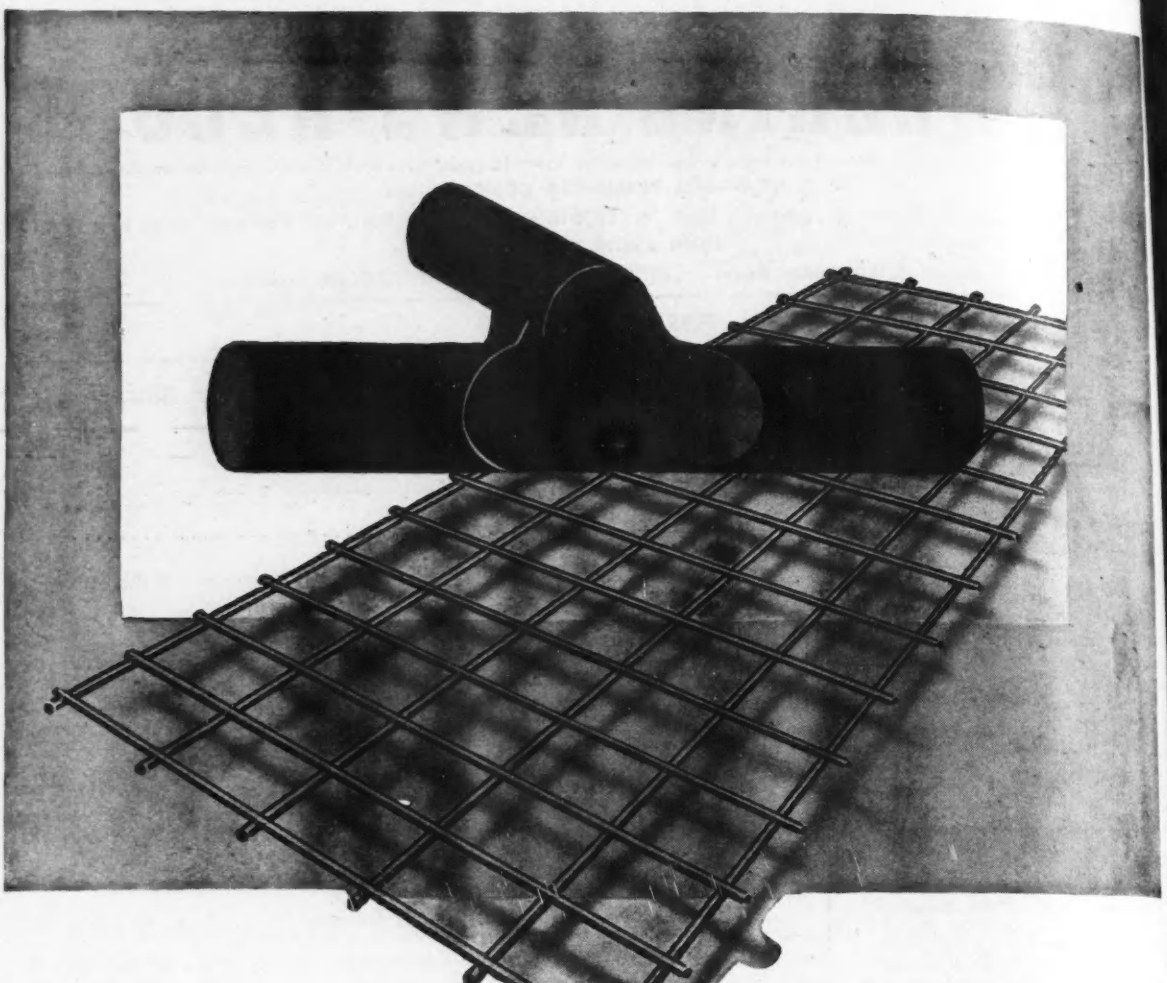
Due to the paper shortage, no index for volume No. 133 (July-December, 1944, will be issued except to subscribers who ask for it. If you want a copy of the index please send in the coupon below.

Editor—Engineering News-Record
McGRAW-HILL PUBLISHING COMPANY
330 West 42d Street, New York 18, N. Y.
Please send Index to address below

Name .....

Street .....

City .....



IT'S THE PERFECT TRUSCON WELD *that Guarantees the Permanence!*

● This is the Truscon electrically-welded bond that makes Welded Steel Fabric the ideal reinforcement for concrete construction. This is the perfectly-integrated union that holds each wire contact with a grip that cannot be broken or loosened. Millions of square feet of this famous product have built permanence and economy into building construction all over America.

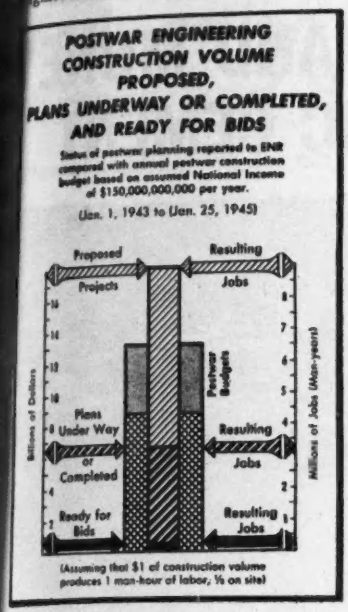
Truscon Welded Steel Fabric not only provides an exceptionally economical method of reinforcing but in addition is much easier to install than many other types of concrete reinforcing. You can be *sure* that Truscon Welded Steel Fabric Reinforcement, and the entire line of Truscon Steel Building Products, will build better concrete structures for you.

TRUSCON STEEL COMPANY, Youngstown 1, Ohio • *Subsidiary of Republic Steel Corporation*

TRUSCON WELDED STEEL FABRIC • *Covers the Continent* •

Postwar Planning Progress Report

THE twenty-five months from January 1943 to February 1945, identified and recorded engineering projects proposed for postwar construction totaled $17,908,411,000. Of this proposed total, engineers and architects were at work


POSTWAR ENGINEERING CONSTRUCTION VOLUME PROPOSED, PLANS UNDERWAY OR COMPLETED, AND READY FOR BIDS
Status of postwar planning reported to ENR compared with annual postwar construction budget based on assumed National Income of $150,000,000,000 per year.
(Jan. 1, 1943 to Jan. 25, 1945)
Proposed Projects
Resulting Jobs
Postwar Budgets
Plans Under Way or Completed
Ready for Bids
Resulting Jobs
Resulting Jobs
Billions of Dollars
Millions of Jobs (Man-years)
(Assuming that $1 of construction volume produces 1 man-hour of labor, ½ on site)

on or had completed plans for $6,445,245,000 worth of postwar construction projects. However, only $517,322,000 worth of these projects were ready for bids with plans completed, financing ready and all site and legal problems settled. An additional $261,961,000 had plans completed, but no financing provided; and another $235,558,000 had the financing arrangements made, but plans had not yet been completed.

The overall postwar totals are good, but analysis reveals that the greater part of the planning reported to date has been done by relatively few states. States with better-than-average records (per capita) in both proposed and planning stages are Connecticut, New York, Maryland, Michigan, Texas, Montana, Nevada, Washington, Oregon, California, and the District of Columbia. Four other states, Pennsylvania, West Virginia, Florida and Ohio, exceed the U. S. average per capita volume in the plans under way or completed.

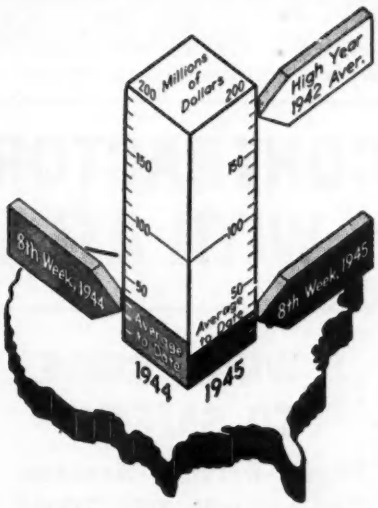
Construction now reported on the planning boards would provide 3,222,600 jobs, (one-third for construction workers at the project site, and two-thirds for industrial workers in factories, mines, forests, etc.). If the total proposed project volume matures into the field construction, 8,954,200 man-years of work would result, assuming that one dollar of construction volume produces one man-hour of labor, and that construction labor works 2,000 man-hours per year.

The proposed volume recorded to date exceeds the minimum annual construction budget by 106 percent and is 37 percent above the maximum. These budgets are based on the volume of construction needed to sustain an assumed national income of $150 billion per year in the postwar period. Volume of work on which plans are under way, a more realistic measure of progress in postwar construction, is 74 percent of the $8.7 billion one-year minimum budget, and is 49 percent of the $13.1 billion maximum.

HIGHEST RANKING STATES IN POSTWAR CONSTRUCTION PLANNING

(As reported to *ENR* from Jan. 1943 through Jan. 1945)

CONSTRUCTION ACTIVITY



As Reported This Week to...
Engineering News-Record

CONTRACT VOLUME

Continental U. S. Only
(Thousands of Dollars)

	Week of Feb. 22 1945	Cumulative 1945 (8 wk.)	Cumulative 1944 (8 wk.)
Federal	$3,583	$112,116	$206,173
State & Municipal	3,236	24,657	14,992
Total Public	$6,819	$136,773	$221,165
Total Private	9,482	60,936	53,231
U. S. Total	**$16,301**	**$197,709**	**$274,396**

WHERE CONSTRUCTION ACTIVITY ORIGINATED THIS WEEK

(Dollar Volume) (Thousands)

Type of Work	This Week	Cumulative 1945 (8 wk.)	Cumulative 1944 (8 kw.)
Waterworks	$198	$6,189	$4,296
Sewerage	2,112	6,273	3,598
Bridges	786	5,829	1,846
Highways	131	10,057	11,491
Earthwork, Waterways	365	3,691	10,262
Buildings, Public	1,222	77,337	124,138
Industrial	7,025	39,584	20,400
Commercial	2,182	13,630	29,013
Unclassified	2,280	35,119	69,352

NOTE: Minimum size projects included are: Waterworks and waterways projects, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

NEW PRODUCTIVE CAPITAL

	Cumulative 1945 (8 wk.)	Cumulative 1944 (8 wk.)
NON-FEDERAL	$119,335	$67,969
Corporate Securities	9,595	47,176
State and Municipal	109,740	15,218
RFC Loans	.....	5,575
FEDERAL	$77,137	$90,832
Total Capital	**$196,472**	**$158,801**

ENR INDEX NUMBERS

Index Base = 100		1913	1926
Construction Cost	Feb. '45	303.70	145.99
Building Cost	Feb. '45	237.71	128.50
Volume	Jan. '45	63	28

CONCRETE HIGHWAY NEWS

Universal Atlas Cement Company (United States Steel Corporation Subsidiary)
Chrysler Building, New York 17, N. Y.

OFFICES: New York, Chicago, Albany, Boston, Philadelphia, Pittsburgh, Minneapolis, Duluth, Cleveland, St. Louis, Kansas City, Des Moines, Birmingham, Wash

CONTRACTOR SAVES TIME AND MONEY WITH ATLAS DURAPLASTIC CEMENT

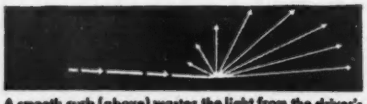
A WHITE GUIDE TO SAFETY

Night Driving Hazards Reduced with Atlas White Concrete Reflecting Curb

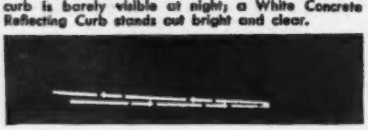
Safe driving depends primarily upon visibility. Obviously, unless a driver can see, he cannot drive at all. The only object he can see is one which itself is lighted, or one which reflects light.

For night driving, the main source of light is the driver's headlamps, and his guide to safety is the road's edge. Curb defines the road's edge, but does so effectively only when it is highly visible. It is visible at night only when it *reflects light* and then only when it reflects that light *in the right direction;* namely, back to the driver. The diagrams below show why.

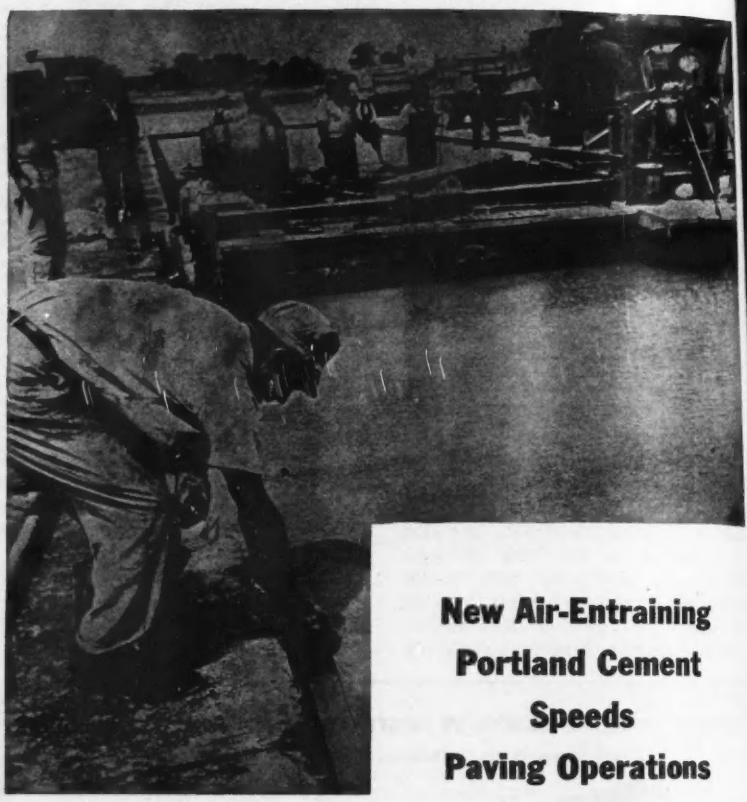
For information on design and installation of reflecting curb, write for a copy of the book, "A White Guide to Safety."



A smooth curb (above) wastes the light from the driver's headlamps—reflects it up and away from the driver. A White Concrete Reflecting Curb (below) conserves this light—reflects it back to the driver. A smooth curb is barely visible at night; a White Concrete Reflecting Curb stands out bright and clear.



ENR-DC-6



New Air-Entraining Portland Cement Speeds Paving Operations

WHEN finishers can float, edge and joint the concrete close to the finishing machine, it reduces overtime for the contractor.

The operations are expedited because Atlas Duraplastic* concrete, compared with a regular portland cement mix, is more plastic and exhibits less bleeding.

In addition, Duraplastic concrete is more durable. It has been used since 1939 for 2½ million sq. yds. of street, highway and airport paving. Some of these jobs are now six years old. All are practically scale-free and all show marked resistance to freezing and thawing and to action of deicing salts.

Write for further information on the development and use of Atlas Duraplastic air-entraining cement.

*Trademark registered, U. A. C. Co.; all rights reserved.

UNIVERSAL ATLAS CEMENTS

UNIVERSAL PORTLAND • ATLAS PORTLAND • ATLAS WHITE • ATLAS DURAPLASTIC • ATLAS HIGH-EARLY

The Week In Engineering and Construction

ENGINEERING NEWS-RECORD • FEBRUARY 22, 1945 • VOLUME 134 • NUMBER 8

Early action is expected on Rivers and Harbors Bill

House considering an omnibus measure corresponding to the one already passed by Senate. Total expenditure of $382,000,000 for 291 projects is proposed

Last week the House Rules Committee cleared for consideration by the House an omnibus Rivers and Harbors Bill corresponding to that already passed by the Senate (*ENR*, Feb. 1, 1945, vol. p. 155). Early action by the House is expected perhaps by Thursday of this week.

The Senate bill (S. 35) authorizes 291 projects expected to require a total expenditure of $382,000,000 and it is free of the several controversial items that blocked passage of a rivers and harbors bill by the last Congress. These include: A $66,000,000 waterway connecting the Tombigbee and Tennessee rivers; construction of a 12-ft. channel on the Beaver-Mahoning rivers below Youngstown, Ohio, at a cost of $38,500,000; a $25,000,000 project providing for improvement of the Savannah River and the construction of the Clark Hill reservoir in Georgia; a $25,000,000 improvement on the Santee-Congaree rivers in North Carolina and improvements on Missouri River.

The latter construction, plus the Savannah River work, including the Clark Hill Dam, are contained in the Flood Control Law (Public Law 534) passed by the last Congress (*ENR*, Dec. 28, 1944, vol. p. 806). Also missing from the bill as ordered out last week by the House committee is a highly controversial provision known as the Elliott amendment exempting the Central Valley Project in California from the limit on the size of tract under individual ownership that is in the Reclamation Act.

Early consideration by the House of the bill was agreed to at this time because ten projects considered of value to the war effort and estimated to require a total expenditure of about $13,250,000 are included. The largest of these is that calling for construction of a canal with locks along the east side of the Mississippi River at Chain of Rocks, which is a short distance above St. Louis, Mo. A $1,200,000 project calling for the improvement of the approaches to the Sault Ste. Marie Locks on the St. Marys River is another war project included.

Photo courtesy Seaman Motors

Tiller clears ice from Milwaukee streets

One pass of a rotary tiller recently shattered a sheet of ice more than 4 in. thick which constituted a considerable traffic hazard on a busy Milwaukee street. Then only a few minutes were required for complete removal of ice by a grader or a rotary broom. The method is also being applied to airport runways, where local conditions determine the value of each of three basic solutions to the ice problem. Thus, in some cases complete removal is desirable; in others, roughening of the ice surface is enough, and in still others badly rutted ice is simply ground down to the level of the rut bottoms. The only difference in the operation of the tiller to accomplish these three objectives lies in the speed and depth to which the rotor is set. Tine breakage and damage to the paved surface is obviated by a shock-compensating device which stops the tines under overload before impact attains destructive force.

• • •

Pennsylvania Turnpike continues at a loss

Although traffic on the superhighway between Harrisburg and Pittsburgh increased last year despite continued driving restrictions, the road was operated at a financial loss, the Pennsylvania State Turnpike Commission has disclosed.

The $1,779,307 which 1,038,527 motorists and truckers paid to travel the 160-mile highway was about $500,000 less than the sum needed to meet operational expenses, a Turnpike Commission spokesman said.

"All operational costs, including interest and maintenance have been met to date," he added, "and will be unless the war continues indefinitely. Sufficient funds were realized during the good years, since the road was opened Oct. 1, 1940, to see us through the lean period," he added.

A total of 721,118 passenger cars and motorcycles and 317,409 commercial vehicles and buses paid toll to travel the turnpike last year.

More bills of engineering interest introduced in the House and Senate

New legislation ranges from bills to control stream pollution to one to revive the 1941 St. Lawrence seaway agreement with Canada

Although the rate at which bills are being introduced in Congress has decreased considerably from the first few days of the present session, a number of bills of engineering interest have been presented during the past few days. In *Engineering News-Record* Jan. 11, vol. p. 16 and Jan. 25, vol. p. 101, long lists of bills were published.

Bills in the Senate

Since the last report the following bills have been introduced: S. 330, creating a division of water pollution control in the U. S. Public Health Service; S. 434, providing for federal aid to states for the acquisition of toll bridges; S, 454, extending the time for start of construction of a bridge across the Mississippi at Helena, Ark.; S. 460, establishing a Columbia Valley Authority to provide for integrated water control and resource development on the Columbia River; and S. 527, extending the time for completing construction of a bridge across the St. Croix River at Hudson, Wis.

Additional bills introduced in the Senate are: S. 535, to prevent pollution of water of the United States; S. 548, creating a 5-man Alaska International Highway Commission to cooperate with any similar agency Canada may appoint in a study of highways to connect the Pacific Northwest of the United States with British Columbia and the Yukon Territory; S. 555, creating a Missouri Valley Authority and S. 556, establishing a commission to make recommendations on a coordinated transportation policy.

Legislation in the House

New bills introduced in the House include: H. R. 1428, providing for the improvement of the Great Lakes-St. Lawrence basin; H. R. 1434, providing for flood control work on the Wabash river at a cost not to exceed $10,000,000; H. R. 1651, granting Congressional consent to the State of Louisiana to construct a toll bridge across the Mississippi River at New Orleans; H. R. 1652, giving similar authority for a free bridge; H. R. 1659, authorizing the Minnesota Department of Highways to construct a bridge across the Pigeon River; H. R. 1695, amending the Boulder Canyon Project Act; H. R. 1700 and H. R. 1774, providing for construction of three east-west and six north-south transcontinental superhighways; H. R. 1760, providing for federal aid to states for the acquisition of toll bridges; and H. R. 1767, authorizing the construction of the initial unit of the Mountain Home project in Idaho.

Also introduced in the House were: H. R. 1824, providing for the creation of eight conservation authorities similar to the Tennessee Valley Authority; H. R. 2030, replacing the present cost-plus and other systems of contracting for public construction by a system of negotiated lump-sum contracts; H. R. 2032, authorizing general shoreline investigations at federal expense; H. R. 2033, approving federal participation in the cost of protecting the shores of public property; and H. R. 2097, changing the boundary between the District of Columbia and Virginia to the high-water mark on the Virginia shore.

Additional bills introduced in the House include: H. R. 2139, authorizing use of Lanham Act funds to complete hospital projects initiated by the Works Projects Administration; H. R. 2142, amending the Federal Highway Act of 1944 by inserting a new subsection authorizing $50,000 for the first post-war fiscal year to start construction of a 10,000-mi. system of foot trails for hikers and campers; H. R. 2173, authorizing surplus funds in the U. S. Treasury for construction of roads and trails serving lands under the jurisdiction of the Office of Indian Affairs in Alaska; H. R. 2203, establishing a Missouri Valley Authority.

St. Lawrence agreement revived

The bill H.R. 1428 approves the agreement between the U. S. and Canada outlined in House Document 153 of the 77th Congress (*ENR*, May 22, 1941, vol. p. 823, and June 5, 1941, vol. p. 863). This agreement provides for the construction of dams and power facilities in the International Rapids section of the St. Lawrence and completion of the St. Lawrence ship canal. The bill also authorizes the President to establish such agencies as are necessary to carry out the agreement. However, the necessary construction, which the bill authorizes to be started at once, must be done by the Chief of Engineers of the U. S. Army.

The Boulder Canyon Project Act, which was approved Dec. 21, 1928, is amended in H. R. 1695 to give a preference to those with military service desiring to settle on lands under the supervision of the Secretary of the Interior.

• • •

No final agreement on Baltimore freeway

Mayor McKeldin's special committee to study proposed Baltimore, Md., traffic-relief routes has selected the much discussed mid-city expressway as the city's No. 1 postwar highway project. The mid-city route is specifically that recommended by Robert Moses, of New York, and his associated consultants (*ENR*, Oct. 19, 1944, vol. p. 467); the Baltimore voters, 3 to 2, authorized a $10,000,000 loan to begin the work (*ENR*, Nov. 16, 1944, vol. p. 608); and Governor O'Conor of Maryland approved a $156,800 contract between the State Road Commission and the J. E. Greiner Co., engineers, for preliminary engineering design, specifications, and contract drawings for connections with the state system (*ENR* Jan. 4, vol. p. 6).

The committee report urges action by the state legislature to authorize the transfer of funds now allocated for part of the harbor bridge project, originally proposed by the state roads commission and dropped, temporarily at least, when the war came.

Mayor McKeldin proposes to build the section of the expressway from the southwestern city line to St. Paul Street at a cost of about $20,000,000. To finance the work he suggested the full use of the $10,000,000 bond issue approved at the last election, the $4,500,000 which Baltimore is scheduled to receive from the federal government, and a contribution of $5,500,000 from the state.

Under a proposal by Governor O'Conor, the city would receive the $5,500,000 from the state but there would be an offset of $2,750,000 in sums due the city in the future as its share in motor vehicle revenue.

However, the City Council is not in favor of the expressway, and it is said that the state will not find itself in advance on the matter of financial aid for the project.

An 18,000-ton capacity, 3-piece steel floating drydock and a 3,000-ton reinforced concrete floating drydock are being installed at the Moore Dry Dock Co. on the Oakland Estuary in San Francisco Harbor. The cost of excavation to 54 ft. below low tide water level will be about $450,000.

Oklahoma engineers oppose contingent fees

reafter, any public body in Okla- desiring preliminary engineering ces must pay for them. The Okla- Society of Professional Engineers s recent convention expanded its of ethics to make it unethical for engineer in its group to do free in the hope of getting paid on a en and if" basis. In the past some neers in the state have done pre- nary work for municipalities and r units of government on the expec- n that money would be voted later ay for the project. "This free work caused more engineering firms to broke than any other one thing," bster L. Benham, Oklahoma City ineer, pointed out.

The society also moved to set up a imum schedule of fees and salaries an effort to standardize the profes- n in the state. The fees range from percent on larger jobs of the $3,- 0,000 bracket to 10 percent for the 0,000 jobs. This is the first time ch a schedule has been adopted.

"This is not an attempt to set a ge schedule for engineers, but merely establish a minimum scale for first ss work," Mr. Benham said.

• • •

Canadian engineers get special labor status

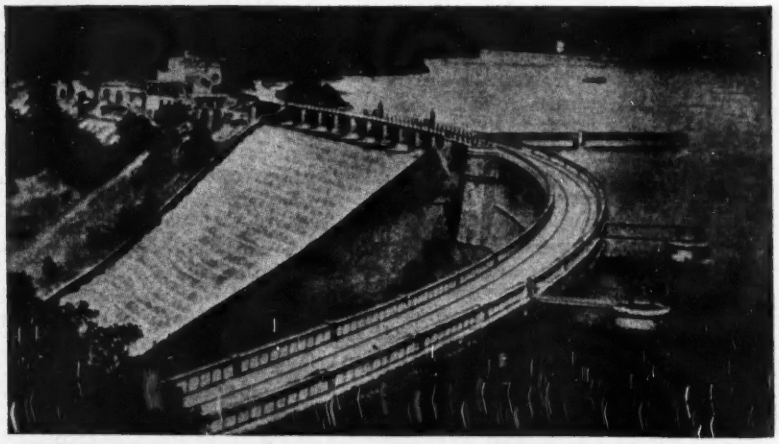
Professional engineering and scien- fic workers in Canada are to be placed nder a new special section of the Na- onal Labor Code, for a trial period of x months, according to an announce- ent made on Feb. 13 by Labor Min- ter Humphrey Mitchell, who thus ade public the decision on this matter f the National Labor Relations Board.

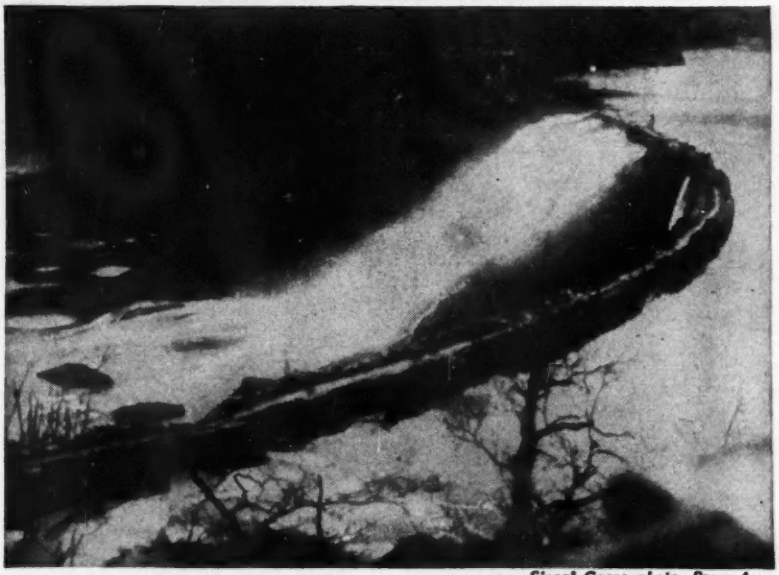
On Jan. 19, fourteen professional en- ineering and allied societies made ap- lication to the board for an additional abor code covering their members or or exclusion from the existing code, ommonly known as P.C. 1003 (the umber of the governmental order-in- ouncil promulgating the code). This pplication was opposed by the Cana- ian Manufacturers Association, and y labor unions (*ENR* Jan. 25, vol. p. 102). Previously, engineers and allied workers had been temporarily classed s confidential workers (not subject to the terms of the code) pending the hearing of the appeal on Jan. 19.

Under the decision now handed down, professional workers of a particular group will be dealt with separately and will not be grouped with other workers in union representation. Under this plan, professional workers in a plant may choose their own representation. "It is felt by the board" said Mr. Mitchell, "that this course will give professional employees an opportunity to acquire some experience in collective bargaining, if they so desire. When they have this experience they will be in a position to decide as to what kind of collective bargaining they want."

At the end of the six months trial period the whole position will again be reviewed by the National Labor Relations Board.

In refusing to grant the petition for a separate code for professional workers, the board stated that such an arrangement would involve substantial expenditures. The arrangement now approved by the board is met in the provinces of Ontario and Quebec by the existence of recently organized federations of engineering and scientific employees, which have been formed with the unofficial endorsation of the respective professional engineering associations in the two provinces. The federations will provide for the linking together of the local groups of professional employees now authorized by the board.





Signal Corps photo, Press Assn.

Americans capture damaged German Dam

On Feb. 4 troops of the American First Army captured Urft River Dam, the second largest of five dams in the Roer River basin that the Germans were expected to destroy to check our crossings of the valleys below. The views above show the dam as it appeared before the war and as seen by our troops at the time it was captured. The Germans had blown out the spillway gates and had destroyed the outlet control towers, but had not destroyed the main body of the dam, the curved masonry structure in the foreground, which is more clearly shown in the picture reproduced in last week's issue (ENR Feb. 15, vol. p. 232).

Bomb and shell craters caused by air attacks on the dam may be seen just below the spillway.

WASHINGTON HIGHLIGHTS

With war housing occupancy figures at the highest point since the start of the war, the National Housing Agency is pressing for an early start on construction of more than 9,000 publicly-financed units for which funds are now available and on some 40,000 units scheduled for private financing with FHA mortgage insurance. Administrator Blandford, of the NHA reports that additional housing is needed in more than 100 communities. To fill this need NHA has requested a $90,000,000 appropriation. Presentations have been made before the deficiency sub-committee of the House Appropriations Committee and since the Lanham committee has already authorized a sufficient sum, the administrator is merely requesting this appropriation. Blandford is also seeking Congressional approval for a $100,000,000 increase in the NHA mortgage ceiling.

Producers in eight states may add actual transportation charges to their f.o.b. ceiling prices for gypsum wall board, lath, sheathing and laminated gypsum products sold to government agencies and delivered to eastern ports for export, the Office of Price Administration announced Feb. 12. The eight states are: Indiana, Iowa, Michigan, Ohio, New York, Massachusetts, Pennsylvania and Virginia. The new action is necessary to increase the quantity of the products available for export to England and France for rehabilitation purposes.

General price increases at the mill level averaging $3 a thousand bd. ft. on hardwood lumber produced in the southern region were authorized on Feb. 9 by the Office of Price Administration. Prices in general will rise 3 percent for grades of No. 2 common or lower and 10 percent for grades of No. 1 common or better.

Operations were begun a few days ago on the exploratory work for Palisades Dam on the Snake River in southern Idaho, the Bureau of Reclamation, which is expected to carry out the project as part of its postwar program, has announced. R. J. Newell, regional director for the bureau, has reports that when the exploratory work is completed. Early start of the dam will be possible. He also revealed that I. Donald Jerman has been transferred to Idaho Falls, Idaho, as project engineer to estab headquarters and organize survey core-drilling and other crews. An e and rockfill dam 273 ft. high and 2 ft. long to contain 12,850,000 cu. yds. material at the crest is expected to built. The project is planned for irri tion, flood control and power devel ment.

No considerable increase in constr tion activity in 1945 as compared w 1944 is expected according to a fo cast appearing in the January issue *Domestic Commerce*, monthly publi tion of the U. S. Department of Co merce. J. Jos W. Palmer, chief of t construction unit. Bureau of Forei and Domestic Commerce, points out th new construction in 1945, if there is unusual rise in either the price of m terials or in the wages paid constructi labor, will likely range between 4 billi dollars and 4.3 billion dollars.

• • •

St. Louis building code liberalized by revision

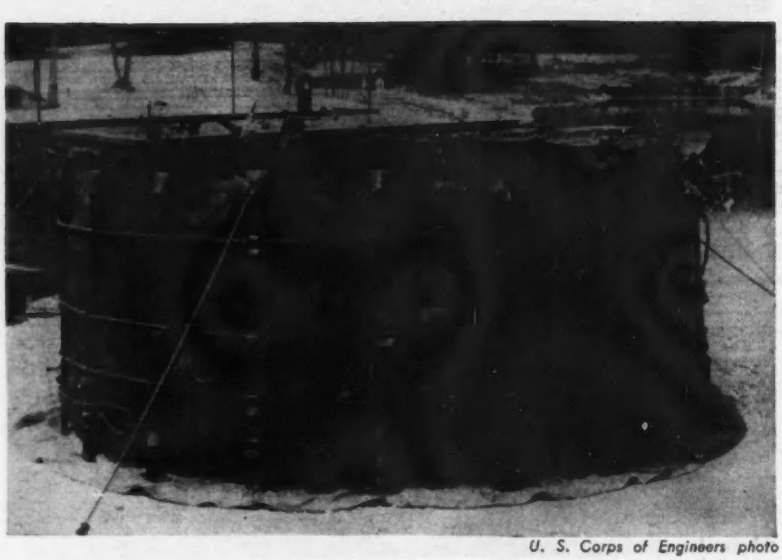
An ordinance providing for a com plete revision of the building code St. Louis, Mo., was passed by the board of aldermen on Feb. 9.

The general effect of the new code which Mayor Aloys P. Kaufmann is ex pected to approve, will be to eliminate "penalizing down-town builders" and to permit the freer use of new construction materials, which should reduce the cost of construction without decreasing public safety. Developed as a result of several years of careful study by a commission of architects, engineers, builders and safety engineers, the new code will permit the construction of buildings of the first, second, third and fourth classes in the downtown section of the city. The present code permits only buildings of the first class in that area.

First class buildings are those that presumably are 100 percent fireproof; second class buildings are fireproof but limited in height; third class are of slow-combustion construction; and fourth class are those with wooden joist construction.

While, apparently, this relaxation of the building requirements for the down-town area might add to the general fire hazard, it is not expected to be a serious matter, since that particular area is now almost completely built up and few new buildings of third or fourth class construction are likely to be erected there.

The new code greatly liberalizes the use of hollow tile, concrete blocks, structural glass and other newer materials in connection with certain construction.



U. S. Corps of Engineers photo

Water tank of glass fabric coated with rubber

To provide combat troops in the Pacific with an adequate supply of pure drinking water, a new type of water storage tank made of glass fabric coated with synthetic rubber has been developed by United States Rubber Co. working closely with the Army Corps of Engineers, and is now in production in four of the company's plants in different parts of the country.

Advantages of the tank are that it is not affected by rot or mild[ew], resists fungus growth, is light weight, extremely strong and durable and completely watertight. Since it is collapsible and can be compactly folded, it is easy to transport and set up in the field. The tank which is 54 in. high and over 11 ft. in diameter will hold 3,000 gallons of water.

Allegheny River basin is ready for floods

The five and one-half inch water content of snow in the Allegheny River basin north of Warren, Pa., presents a real flood hazard, say U. S. Army Engineers in Pittsburgh. A severe flood would result if heavy warm rains accelerate the melting of snow. Total snowfall this winter already is 110 inches in some places.

Since Pittsburgh's disastrous flood in March, 1936, eight flood storage dams have been placed in operation. The dams would store 123 billion gal. in the Allegheny River basin, 172 billion gal. in the Monongahela River basin, and 65 billion gal. in the Beaver basin.

In 1942 they reduced the flood crest in Pittsburgh an estimated 2.8 ft., and an estimated 3.6 ft. at Wheeling, W. Va.

Today, it is said, the dams would cut 5.5 ft. from a 46-ft. crest at Pittsburgh, four feet from a 40-ft. crest, three ft. from a 35-ft. crest. Normal river stage in Pittsburgh is about 16 feet.

Meteorologist T. E. Reed of the Weather Bureau in Binghamton, N. Y., where the snowfall on Feb. 14 totaled eight inches, said that the southern counties of the state "are sitting on a powder keg" as result of the season's snowfall of eighty-seven inches.

Mr. Reed said present conditions are similar to those which caused the St. Patrick's Day flood of 1936 on the Chenango and Susquehanna rivers. A prolonged period of warm weather, followed by rain, could result in a similar overflow he said.

• • •

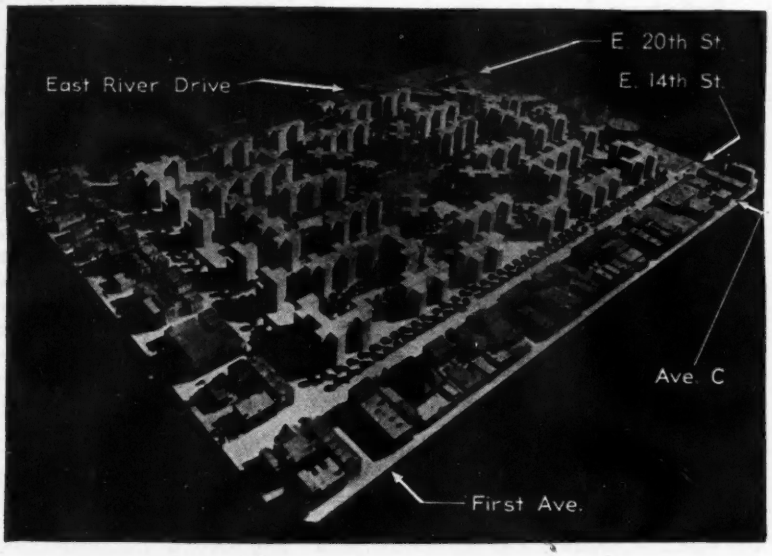
WPB asks voluntary curb on copper and lead use

The office of War Utilities of the War Production Board has sent a letter to water utility concerns asking their voluntary cooperation in conserving copper tubing and lead products for war purposes. It reads, in part, as follows:

"Because of the necessity for an immediate increase in the production of artillery, mortar and small arms ammunition and certain other important items of material and equipment for the military forces, the demand on brass mills and plants producing lead and lead products has greatly increased and will increase much more during the months ahead. Shortages of manpower and facilities will make it necessary to limit their production for civilian uses.

"The Office of War Utilities believes that, through an appeal to water utility operators to conserve in the use of copper tubing and lead and lead products, it will be possible during the critical months ahead to reduce the shipments of these materials to a point where all essential needs of water utilities can be met without a serious drain on the production facilities necessary for military production.

"Because of the fine record of water utilities in supporting war measures, we have recommended this voluntary method of conservation in lieu of a limitation order. The purpose of this letter is to request your cooperation by limiting, until further notice, your purchases of these materials to essential minimums."



Largest postwar housing project in U. S. planned

Stuyvesant Town, to be developed in midtown Manhattan after the war by the Metropolitan Life Insurance Co. under an agreement with the city of New York, will constitute one of the first large-scale developments replacing a blighted section of an American city, and to date it is the largest postwar housing project proposed, the estimated cost being $26,462,000.

As shown in this photograph of a model of the development, only one-quarter of the 67-acre site comprising 18 "gashouse district" blocks near the East River will be occupied by the 41 buildings. The greater part of the community acreage will be utilized for 8 playgrounds, a 3-acre centrally located park, gardens and walks.

About 8,000 families will be housed in 35 fireproof apartment buildings, 13 stories high with some 10-story wings. Eight of the buildings, fronting on First Avenue and on E. 14th Street, will contain stores. The roofs of the six, large, one-story garages, located back of apartment buildings on the four outside corners of the site and in the rear of the buildings facing 14th and 20th Streets will be covered with 3 ft. of earth and landscaped.

Plans for the houses have been filed with the New York City authorities (ENR Feb. 15, 1945, vol. p. 230) and clearing of the site will commence April 1. The Metropolitan Life Insurance Co. is acquiring an additional 15 acres adjacent to Stuyvesant Town on the north, including also the area occupied by the gas plants. Here will be built another park-like residential community to be known as Peter Cooper Village.

Planning of these projects is in the hands of a board of design comprised of Richmond H. Shreve of Shreve, Lamb & Harmon, architects, chairman; Andrew J. Eken of Starrett Bros. & Eken, contractors; George Gove, former secretary of the New York State Board of Housing; Gilmore D. Clarke, consulting engineer and dean, School of Architecture, Cornell University; Robert W. Dowling, real estate expert; Henry C. Meyer, Jr., consulting engineer; and Irwin Clavan, architect.

"Public buildings area" proposed for Seattle

The Seattle city planning commission expects to file a report early in March with Mayor William F. Devin on the establishment of a "public buildings area" in that city.

Acting as consultant for the commission is Harland Bartholomew of St. Louis, Mo., head of Harland Bartholomew & Associates, civil engineers, city planners and landscape architects.

Need for the report arises from the proposed construction or purchase of a new municipal building.

Potomac flood control calls for 14 dams

Col. John M. Johnson, head of the Washington, D. C., district office of the U. S. Army Engineers has forwarded to the office of Chief of Engineers plans for a $235,720,000 flood-control program for the Potomac River basin. Construction of 14 dams to develop about 350,000 kw. of hydro-electric power is proposed and completion of the Savage River Dam now under construction near Cumberland, Md., by the Upper Potomac River Commission is planned. Under study for about two years, the plan probably will be place before the second session of Congress some time this summer.

Seven dams on the Potomac itself are called for. These are a multiple-purpose dam at Riverbend, near Washington; power dams at two sites near Washington known as Chain Bridge and Bear Island; and power dams at Harpers Ferry, Rockymarsh Run, Pinesburg, and Orleans, all sites on the Maryland-West Virginia border. Two multiple-purpose dams are scheduled for construction on the south branch of the Potomac, one at Royal Glen near Petersburg, W. Va., and one at Springfield, W. Va.

Also proposed are multiple-purpose projects near Millville, Va., on the Shenandoah River; on the Cacapon River at Ede's Fort, W. Va., and on Patterson Creek in West Virginia. In addition, a diversion dam would be built at Keyser, W. Va., to divert water into Patterson Creek, and a storage dam on the north fork of the Shennadoah at Brock's Gap, W. Va.

• • •

Brooklyn Bridge stories wanted by publisher

Interesting anecdotes, old pictures, or stories about the Brooklyn Bridge are wanted by Harcourt, Brace & Co., publishers. For the first 25 acceptable entries submitted before March 15, they will award an autographed, first edition copy of "The Builders of the Bridge" by D. B. Steinman, well known New York consulting engineer. This is the story of John Roebling and his son, the men who built the Brooklyn Bridge.

One woman sent to the publishers two tickets purchased for three cents in 1883 to walk across the bridge. Someone has unearthed the fact that Hart Crane was living in Roebling's house, with its splendid view of the bridge, when he wrote his famous poem "The Bridge".

These are the kind of stories wanted—fact, anecdote, legend—anything colorful that the famous bridge calls to mind. All material should be sent to the Bridge Editor, Harcourt, Brace and Co., 383 Madison Ave., New York 17, N. Y.

Arkansas commission plans river study

The Arkansas State Flood Control Commission is planning to complete a study of the U. S. Engineers' comprehensive report on the Arkansas River valley flood control program calling for an expenditure of $350,000,000 to $400,000,000 and has appointed a committee of three from the membership to devote practically all of their time to the fact-finding, and has authorized the employment of engineers and experts to compile data to be presented to the Board of Engineers for Rivers and Harbors, at a hearing to be held in Little Rock early in May.

A waterway to connect Little Rock and Tulsa, Okla., with the Mississippi system has been proposed and tentative plans include a proposal for a canal from Little Rock to the White River, and also a cut-off canal between the White and Mississippi rivers which would shorten the natural water route between Little Rock and Memphis by about 100 miles. The canal, carrying Arkansas River water by gravity flow, would be available for irrigation purposes in the Grand Prairie section, the rice belt of Arkansas, and to provide a channel for freight barges.

Pollution problems of Ohio Valley discussed

Recently at Cincinnati, Ohio, representatives of pulp, paper and paperboard industries in Ohio, Indiana, Illinois and Iowa met with representatives of regulatory agencies to discuss water control and stream pollution.

The Chamber of Commerce passed a resolution asking its Pittsburgh counterpart "to reconsider its previous stand and to lend its support in an effort to secure passage by the General Assembly of Pennsylvania of legislation ratifying the Ohio River Valley Stream Sanitation Compact".

The meeting was held under auspices of the National Council for Stream Improvement, set up by the paper industry to inquire into the industry's waste problems. Officials of the Ohio, Indiana and Illinois engineering departments of the U. S. Pulbic Health Service attended.

In our report of the award of the John Fitz Medal to John L. Savage (*ENR* Jan. 25, vol. p. 100), the name of his sister, who represented him at the ceremony, was incorrectly given. It should have read Mrs. Mary S. Winston.

JOBS OF THE WEEK

AIRPORT, San Antonio, Tex.

U. S. Engineers, Fort Sam Houston, received the lowest bid for runways, taxiways, roads, control tower, outside night lighting system, for airfield from M. E. Killian & Co. and E. B. Darby Co., San Antonio, Tex., at $2,029,221.

DWELLINGS, Washington, D. C.

National Capitol Housing, Washington, D. C., received the lowest bid for 440 unit dwellings from T. C. Owen, Washington, D. C., at $2,130,758. Saarinen & Swanson, Washington, are the architects.

HOSPITAL, Murfreesboro, Tenn.

Veterans Bureau, Arlington Bldg., Washington, D. C., received the lowest bid for additional buildings and facilities at Veterans Hospital from Foster & Creighton Co., Nashville, Tenn. at $1,779,887.

POWER PLANT, Sarasota, Fla.

Florida Power & Light Co., Miami, Fla., will construct a power plant, near Sarasota to cost $2,000,000. Work will be done by separate contracts. H. V. Street Co., Miami, Fla., and Ebasco Services, Inc., New York, N. Y., are the architects.

TIRE PRODUCTION PLANT, Detroit, Mich.

U. S. Rubber Co., Detroit, Mich., awarded a contract for the construction of brick, steel, concrete addition to a tire producing plant to O. W. Burke Co., Detroit, Mich. The estimated cost is $3,000,000. Lockwood, Greene Engineers, Inc., New York, N. Y., is the engineer.

SEWERS AT AIRPORT, Idlewild, N. Y.

Department Marine & Aviation, New York City, has awarded contracts to build sewers to Andrew Catapano, Laurelton, N. Y., $1,140,824 and to Nicholas di Menna & Sons, Inc., New York City, $882,000.

Note—Additional bidding and contract news on many projects large and small appear in the Construction News section beginning on page 155.

OBITUARY

Russell V. Banta, 56, vice president and chief engineer of Lockwood Greene Engineers, Inc., New York City, died at Mount Vernon, N. Y., Feb. 18. A graduate of the College of Engineering, Cornell University, 1909, Mr. Banta was a consulting engineer until the United States entered the first World War, in which he served in the infantry. He joined Lockwood Greene soon after the armistice. Since then his principal achievements had been the engineering designs for the following New York City buildings: The 8-floor main unit of the New York Tribune Building on West 40th St.; the Daily News Building on West 42nd St.; and the McGraw-Hill Building on West 42nd St.

Varnum P. Curtis, 67, engineer and bridge builder, died at Worcester, Mass., Feb. 17. Mr. Curtis was graduated from Worcester Polytechnic Institute in 1901. He was employed for many years in bridge construction work in Massachusetts and New York City. Before retiring in 1942, he was associated with the Worcester city engineering department for three years.

James T. A. McCann, 52, assistant engineer of the White Plains, N. Y., department of public works and an employee of the city for the last 28 years, died there, Feb. 17.

Lawrence J. Hallinan, 84, of the Hallinan Bros. construction firm, Akron, Ohio, died in Akron, Feb. 2.

Harry E. Huestis, 70, chief engineer of the National Harbors Board, Quebec, died Feb. 8.

Frederick Jaspersen, 78, civil engineer, died at Melrose Park, Pa., Feb. 7. He retired in 1938 after 47 years with the Reading Railroad. He was a lieutenant colonel of Engineers in the first World War, and following the armistice he led a company of engineers in Siberia.

Harry Frederick Bennett, 58, district engineer at London, Ont., for the Department of Public Works of Canada, and one of the dominion's best known engineers, died Jan. 31. He was a graduate of the University of New Brunswick and joined the Public Works Department in 1909. He worked in the Maritime Provinces before becoming district engineer at Sault Ste. Marie, Ont., whence he went to London in 1937. He was chairman of the Engineering Institute of Canada's committee on the young engineer.

Charles P. Bower, 75, retired engineer and head of the Bower Construction Co., died Feb. 8 in Philadelphia.

Merton Leslie Emerson, 62, died at Alexandria, Va., Feb. 8. He was a civil engineer graduate of the Massachusetts Institute of Technology. Since 1933 he had been with the Federal Works Administration, Washington, D. C.

J. Hermon Terry, 75, retired president of J. H. Terry and Co., engineers and contractors, died Feb. 8 at his home at Edgewater Park, N. J.

• • •

Charles D. Snead dies, division engineer, PRA

Charles D. Snead, 59, division engineer, Public Roads Administration, Federal Works Agency, died Feb. 13. For some years he has directed federal highway activity in Alabama, Georgia, Florida, Mississippi and Tennessee, with headquarters at Montgomery, Ala.

Mr. Snead was a native of Virginia, and was graduated in engineering at Virginia Polytechnic Institute in 1906. The following year he did post-graduate work there and received his C. E. degree. He was employed by the Virginia State Highway Commission from 1908 to 1916, entering as a draftsman and being promoted to complete charge of all bridge work in the state. From 1916 to 1920 he was in charge of bridge work for the Department of Public Roads of Kentucky.

In 1920 he joined the Public Roads Administration as senior highway bridge engineer. After a few months at the Fort Worth district office he was placed in charge of bridge work at the Montgomery, Ala., district office. He prepared special reports on the causeway and bridges for the Key West Highway and supervised preparation of plans for many different types of bridges, some of which were notable for the deepwater foundations required.

In 1930 Mr. Snead became district engineer and had since supervised the federal highway program in five southern states. Since the beginning of the war his work has consisted largely of supervision of construction of access roads to Army and Navy establishments and war production plants.

MEETINGS

Regional and Local

ONTARIO GOOD ROADS ASSOCIATION, annual convention, Royal York Hotel, Toronto, Canada, Feb. 28-March 1.

MISSOURI VALLEY CONFERENCE OF STATE HIGHWAY DEPARTMENTS, Palmer House, Chicago, March 1-3.

NORTH WEST GOOD ROADS ASSOCIATION OF MINNESOTA, annual meeting Nicollet Hotel, Minneapolis, Minn., March 16.

CANADIAN SECTION, AMERICAN WATER WORKS ASSOCIATION, Toronto, Canada, March 19-21.

MONTANA SECTION, AMERICAN WATER WORKS ASSOCIATION, Lewiston, Mont., April 13-14.

Cancellations

INDIANA SECTION, AMERICAN WATER WORKS ASSOCIATION, Lafayette, Ind., March 15-16.

SOUTHEASTERN SECTION, AMERICAN WATER WORKS ASSOCIATION, Montgomery, Ala., March 19-21.

OHIO SECTION, AMERICAN WATER WORKS ASSOCIATION, Columbus, Ohio, April 5-6.

NEW YORK SECTION, AMERICAN WATER WORKS ASSOCIATION, Elmira, N. Y., April 19-20.

• • •

Montana signs compact for Yellowstone water

The Yellowstone River compact for division of waters among Montana, Wyoming and North Dakota has been signed by Montana commission members and is being prepared for presentation to the state legislature.

Also affixed to the compact are the signatures of North Dakota members and all but three members of the Wyoming delegation. These members, all from the Tongue River watershed, refused to agree to the water distribution for that river. State Engineer Fred Buck said he was hopeful that North Dakota and Wyoming will ratify the compact, which provides for distribution of waters for present and potential irrigation and storage.

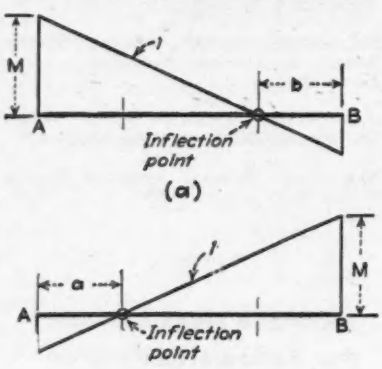
Mr. Buck said storage development on the river and its tributaries eventually will take care of all needs, but at present both the Bureau of Reclamation and Army Engineers are anxious to establish a water division basis to permit construction of needed storage reservoirs, particularly at the Boysen site on the Big Horn River in Wyoming.

Comment and Discussion

Readers' opinions on matters that concern engineers and contractors

Inflection Point

Sir: In his letter published in *ENR* Oct. 19, 1944, vol. p. 469, M. W. Rosenstein has stated that it is inadvisable to use the term "inflection point" in reference to the fixed point. The writer finds that the term "fixed point" does not contribute to the clarity of the graphics. Graphical distribution of moments shown in the writer's letter, *ENR* July 27, 1944, vol. p. 81, and also in the booklet entitled *Analysis of Continuous Frames by Graphical Distribution of Moments*, is based on the characteristic



points termed "central points, inflection points, and elastic points."

All these sets of points are fixed points, because their location is fixed by the elastic and geometrical properties of structure. Therefore, the term "fixed point" applied only to the inflection point is misleading. Location of the characteristic points, including the inflection points, is not varied with the given loading. Geometric expression of the inflection points is obvious from the end bending moment diagrams shown on the accompanying sketches (a) and (b). Moment at the inflection point is zero, as it was also correctly stated by Mr. Rosenstein. With the inflection point the moment diagram may be determined by line 1 drawn through the inflection point.

Points of inflection in the member sustaining dead load and live load are termed "dead load inflection point" and "live load inflection point", respectively.

Point of inflection in a member distorted by a transverse displacement of the end supports is termed "contraflexure point", sketch (c). The contraflexure point is also characteristic to the physical properties of frame. The contraflexure point may be determined by line 2 drawn through the end ordinates equal to the inflection point distances. In the moment diagram produced by displacement of the end supports, the moment at the contraflexure point is zero. Development of a method often requires revision of the terms previously used.

A. A. EREMIN
Associate Bridge Engineer
California State Highways
Sacramento, California

Composite Action

Sir: Of particular interest were the comments on "Composite Action" by W. A. Ozanne (*ENR* Oct. 5, 1944, vol. p. 400) in which the Maribyrnong River bridge at Melbourne, Australia, was mentioned. Six welded steel girders were used on a 70-ft. simply supported span. This gives a rather low span-depth ratio of approximately 12, thus explaining the small deflection under maximum load.

The Jordan Lane Bridge in Wethersfield, Conn., built by the Connecticut State Highway Department in 1942, is another case where all-welded girders were used with composite action. Girders of 7-ft. depth were used on a span of 120 ft.

Such welded sections are particularly adapted to composite design due to the saving of steel by using a smaller top than bottom flange. Furthermore, composite action is of great advantage to welded construction since it provides additional stiffness which considerably reduces vibration in the girders. Vibration studies conducted by Ohio State University (*Bulletin No. 119*, Engineering Experiment Station, Ohio State University, Columbus, Ohio) demonstrate that although the resisting moment of the observed girders is increased from 35 to 50 percent by using composite construction, their effective moment of inertia for resisting vibrations is increased from 250 to 300 percent. The lessening of vibrations in welded construction is extremely important since both the weld metal and the base material near the welds is considerably more subject to failure caused by vibration and fatigue than is the rest of the structural steel.

The prestressing of the steel beam of a composite section by using temporary wedged-up intermediate supports to produce initial compressive stresses in the bottom flange is not necessarily economical. It is doubtful whether the saving of steel would compensate for the additional cost of these supports. Prestressing never causes a uniform tensile stress across the steel section if shrinkage and plastic flow of the concrete are considered. Only, if they are neglected and the neutral axis of the composite section happens to lie at the top of the steel beam, can the tensile stress under design load be uniform.

Numerous tests on composite beams demonstrate that any initial stresses in the steel beam due to pure bending have no influence on the ultimate carrying capacity of the composite section. Therefore, if the reduction of the stress in the steel beam caused by prestressing is considered in the design, the steel section required would be correspondingly smaller with a resultant lowered carrying capacity for the composite beam. Consequently, consideration of the prestresses caused by wedging up these supports should not be allowed in design practice. However, temporary supports can certainly be used to permit the composite section to carry both the dead and the live load, or even to eliminate the dead load deflection. But it is often difficult and costly to make such temporary supports entirely effective. Therefore, for most bridges a composite section without temporary sup-

is recommended with the steel designed to carry the dead load the composite section to carry the load. Since this recommended ion would be larger than that re- ed if temporary supports were and since initial stresses in the have no effect on the ultimate this section without supports ld carry a considerably higher mate load. Thus, the use of a er allowable unit bending stress he steel seems justified for a sec- designed without temporary in- ediate supports which would re- the difference in the steel re- red for the two designs.

Since the design of a composite m with temporary supports as- es that the dead load is carried the composite section, the effect of tic flow in the concrete must be sidered. On the other hand, the ommended design without tem- ary supports eliminates plastic , which can only occur when the crete has to sustain a permanent mpressive stress.

The influence of shrinkage and tic flow of the concrete on the esses in the composite section can computed only roughly due to the ny uncertain factors. However, esses due to plastic flow can be de- mined about as accurately as those to shrinkage. In most composite tions the effect of shrinkage is to duce compression in the concrete d to add compression to the stresses the steel. Plastic flow has the same ect on the concrete; however, in the el it increases the tensile stresses the bottom flange and adds com- ession to the stresses in the top nge. The influence of plastic flow not limited only to composite ams. A reinforced concrete beam more affected by plastic flow than equivalent composite beam be- use the greater dead load produces greater permanent unit compressive ess in the concrete.

C. P. CUENI
Vice President
Porete Manufacturing Co.
North Arlington, N. J.

Keep The Record Straight

Sir: This will acknowledge and ank you for the copy of *Engineer- g News Record* for January 4, 1945, hich contains, on page 8, an article lative to my reward of excellence.

In order that the record may be correct and also to forestall any possible charges that the Suggestions Committee of the Interior Department was rather penurious in its cash award of $300 for a reported annual saving of $480,000 per year, as stated in the article, I wish to correct the statement to read as follows:

"The total annual saving to the Government by the suggestion was estimated to be about $1,200 per year for about 4,000 gaging stations."

A. H. HORTON
District Engineer
U. S. Geological Survey
College Park, Md.

Brazil's License Laws

Sir: Regarding the letter, "Argentine License Laws", in *Engineering News-Record* Nov. 30, 1944, the inference is that the Argentine decree places no time limit on the revalidation of foreign diplomas. If this is correct, the Argentine decree is more liberal than the Brazilian decree. In December, 1933, a national license law was proposed in that country and written into the Brazilian constitution of July 15th, 1934. After that date no revalidation of foreign diplomas was permitted except to native-born Brazilians or to those who had rendered active military service to the republic. Unless a foreigner, actually resident in Brazil and practicing his profession at that date had revalidated his diploma on the date set, he was not permitted to exercise the duties of an engineer. In short, the practice of engineering was restricted thereafter to native-born Brazilians or to those who had rendered military service. The same provisions governed law, medicine, dentistry, pharmacy, accounting, and engaging in fishery, or as officer in the Brazilian merchant marine or as an air pilot.

Now (and this should be of interest), at the time the law went into effect, those who held diplomas from Canadian or British colleges or technical schools, or from European schools of any continental country, had no difficulty in the revalidation of their degrees; the ruling was that those schools were recognized by the respective countries and therefore the Brazilian government recognized them. But in the case of degrees granted in the United States, it developed that such degrees were issued merely on state authority and not by the federal government; hence it became necessary to send U. S. diplomas to the United States and (1) have the signatures thereon attested by a notary public in the county where they were issued, (2) to send the diploma to the state capital and have the notary public's signature attested by the secretary of the state issuing the diploma, and (3) have the governor of the state attest the signature of the state secretary. We forget if it was necessary to have Washington attest the governor's signature.

Furthermore, the decree divided engineering into specific categories such as civil, electrical, mining, sanitary, structural, structural-architectural, hydraulic, land surveying, agricultural, and industrial. We believe no mention was made of mechanical engineering (probably because at the time mechanical engineering was not taught in Brazilian schools) and chemical engineering was omitted. A friend of the writer held a chemical engineer's degree from a noted U. S. school and, though a native-born Brazilian, he had to have a special ruling made in his case to revalidate his degree. The decree further restricted the practice of engineering to the particular category in which he held his degree and the duties permitted in each category were specified in detail.

(The writer of this letter, who prefers to remain anonymous, has had more than a quarter-century of intimate experience with people and affairs in Latin America.—Editors)

Correction

Sir: There are two typographer's errors in Part II of my article on "Photogrammetric Engineering" (*ENR* Dec. 14, 1944, vol. p. 748) which seriously affect the reader's understanding of an important item in the article. The first of these occurs on vol. p. 748, column 3, line 26 which should read: (thus $P_d = X_d - X'_d$). The second occurs near the bottom of the same column following Eq. 4. Here, H-h is the height of the airplane above the ground point in question; not the height of the airplane above the average elevation of the two photographs. This fact is very evident for point D in Fig. 2.

REYNOLD E. ASK
4515 Davenport St.
Washington 16, D. C.

EDITORIALS

VOLUME 134 NUMBER 8

February 22, 1945

Two Birds With One Stone

ISSUANCE OF ORDERS to some 200 municipalities in Pennsylvania by that state's Sanitary Water Board —calling for the preparation and submission for approval of plans for sewage treatment works— focuses attention to one of the special situations wherein the strong arm of the law can aid and abet postwar planning of public works. In issuing these orders the Sanitary Water Board has acted in accordance with its legal responsibilities relating to stream-pollution control. However, in exercising jurisdiction at this time, the Pennsylvania sanitation authorities also act in the role of effective promoters of the "blueprint now" concept. Prompt cooperation of the affected municipalities with the Sanitary Water Board's orders will result in the satisfaction of local public health needs and likewise serve the national interest in postwar preparedness for job security.

Slum Clearance Gets a Break

SLUM CLEARANCE in Chicago got a break when the Illinois Supreme Court recently upheld the constitutionality of the Illinois neighborhood redevelopment corporation law. By virtue of this act of the 1941 state legislature (*ENR* Aug. 14, 1941, p. 236) the right of eminent domain can be invoked against a minority of property owners obstructing the development of any privately financed housing project, provided that 61 percent of the property involved has been obtained by normal procedure. Such projects, however, must be approved by a municipal redevelopment committee and the local planning agency. The act had been declared unconstitutional in December, 1943, (*ENR* Jan. 6, 1944, p. 11) by a circuit court judge who ruled against private corporations obtaining property by the right of eminent domain. The supreme court's reversal of the circuit court not only opens the way for large slum clearance projects but also encourages the rebuilding of blighted areas on a small scale. Project improvement areas can be as small as two square blocks in Chicago or one square block in lesser communities. For example, if land owners in a two-block area have an eyesore in their midst they can form a neighborhood redevelopment corporation to remove the blight. On the other hand, complete rebuilding of an entire area is not mandatory under the act. While much remains to be done to permit taking full advantage of the law, upholding of its constitutionality is an effective aid in stimulating private enterprize to clear blighted areas and rebuild them.

Good From An Ill Wind

SOME VERY UNUSUAL STRUCTURES have resulted from wartime requirements for special-purpose buildings plus wartime difficulty in getting the usual building materials. Substitutions, such as timber for steel, are natural under such conditions and there has been inducement to use new designs. The Navy's great timber-arch blimp hangars were the first outstanding examples of this pioneer thinking. More recently, designers have applied their ingenuity to glued and laminated timber construction with surprising results. A striking example is described in this issue. The need for great open shops in which a self-propelled crane could operate in assembling war equipment was met by an enclosure carried on high three-hinged arches of laminated timber built into double-channel sections. Gluing was used extensively in building up these members, which have a flange width of 14 in. and a maximum depth of nearly 50 in. Though some unforeseen problems were experienced in assembling these high arch ribs in the field, they were overcome without difficulty. Such a structure represents an advance in design and construction methods that would have taken much longer to achieve in times of peace. "It is an ill wind that blows nobody good."

Are You Going to Read a Paper?

FROM THE VIEWPOINT of the person at whom ideas are aimed, there is a distinct difference between the oral and written methods of expression of thought. Often the written word when read aloud, despite the listener's avowed interest in the subject matter, induces a somnolent state. And an exciting bit of oratory reproduced in cold print can be awfully dull reading. These considerations need to be kept in mind by those who prepare papers for presentation at technical meetings. Too frequently, engineers, when called upon to give a talk on a technical subject, present their paper as they would have it appear in print. All the rules of effective oratory are disregarded, and because of the ineffec-

veness of the presentation, the audience loses an ea here and an idea there, until so fully confused at there is nothing left to do but relax. To all ose who will in the future be asked to read a chnical paper this plea is made: Do not read the me paper you want published! Prepare another tended solely for oral delivery.

oll Highways Again

HIS BUDGET MESSAGE to the New York State gislature, Governor Dewey said that the division the budget was investigating the feasibility of aking the state's projected system of "thruways" holly or largely self-supporting by tolls and that would make final recommendations on that subct at a later date. The "thruways" are to extend om New York up the Hudson valley to Albany nd west through the populous center of the state Buffalo and the Pennsylvania line, a distance of 82 miles.

New York does not now lack funds with which start building the proposed superhighways and ould not want for funds to complete them if it ere to devote to highway purposes all the money collects in gasoline taxes and motor vehicle fees. n 1943, the last year for which figures are availble, the state collected $91,079,000 in such fees nd taxes and diverted $33,421,000 to other than ighway purposes. Hence tolls are not necessary o finance this expansion of the highway system.

If tolls are charged, no federal-aid funds can be sed to construct the proposed superhighways. As result, their cost to the citizens of the state will e practically double what it would be without he toll. That would indicate that the tolls must be airly high. Therefore, directly and indirectly, he New York motorist will pay a high price to ide on the projected "thruways" if a toll is mposed.

But the inequity of the toll is only one factor ndicating the unsoundness of this and like proposals to make toll roads out of the superhighways hat are needed to expand and modernize our state ighway systems. The proposed New York "thruways" for example, were planned as an integral art of the state highway system, a new main trunk o which the longer-distance travel will flow, thus elieving congestion on the older roads and extending their useful life. Anything, therefore, that tends to divert traffic from the new superhighways reduces their usefulness and so is contrary to sound highway policy.

Making toll roads of these superhighways diverts traffic in two ways. First, there is the toll. Long-distance travel is not seriously affected by a toll, if the toll is moderate, but much medium-distance travel inevitably is diverted because the time saving or the convenience does not justify the added expense. A motorist who normally would enter a free superhighway at the first access point, run 10 or 15 miles and leave at an exit nearest to his destination is not likely to take that route if a toll must be paid.

A second deterring factor is the reduction in access points that is essential to a toll highway if the cost of toll collection is not to become prohibitive. Access to superhighways must be limited if their efficiency and safety is not to be impaired, but these points can be much more frequent on a free highway than would be practical for a toll road. This condition further reduces the highway's usefulness to the short-distance motorist, who makes up the great bulk of highway travel. The new highway is not the service to these people that it could be. They still will use the old highways, congestion, therefore, is not appreciably reduced, and the time when the old pavements must be replaced is advanced at a more rapid pace.

Adding a toll to new main highways that are built to improve our highway systems has always appealed to those who have to arrange the financing because it is such an easy way to extract something more from the motorist. Fortunately, the Public Roads Administration and the experienced highway authorities in Congress have recognized the unsoundness of tolls except in special circumstances, and Congress has set up a fairly effective bar against their widespread application. Some justification for tolls can be found in the case of a costly river crossing, but no such justification can be found for charging tolls on needed highways like the projected "thruways" in New York. Proposals to place tolls on main elements of our national system of highways should be strongly resisted as unsound in principle. The imposition of tolls reduces the usefulness of a new highway and deprives the motorist of free use of a facility that could be free if the motor-vehicle taxes he is paying were all used for highway purposes.

NGINEERING NEWS-RECORD WALDO G. BOWMAN, *Editor* **Copyright, 1945, by McGraw-Hill Publishing Company, Inc.**
DWARD J. CLEARY, *Managing Editor. New York:* V. T. BOUGHTON, H. W. HUNT, E. R. DENMARK, T. D. MacGREGOR, and H. P. ORLAND.
Chicago: H. W. RICHARDSON, J. R. CARR. *Washington:* PAUL WOOTON, A. N. CARTER. *San Francisco:* N. A. BOWERS.
DITORIAL OFFICES: 330 WEST FORTY-SECOND STREET, NEW YORK, N. Y.

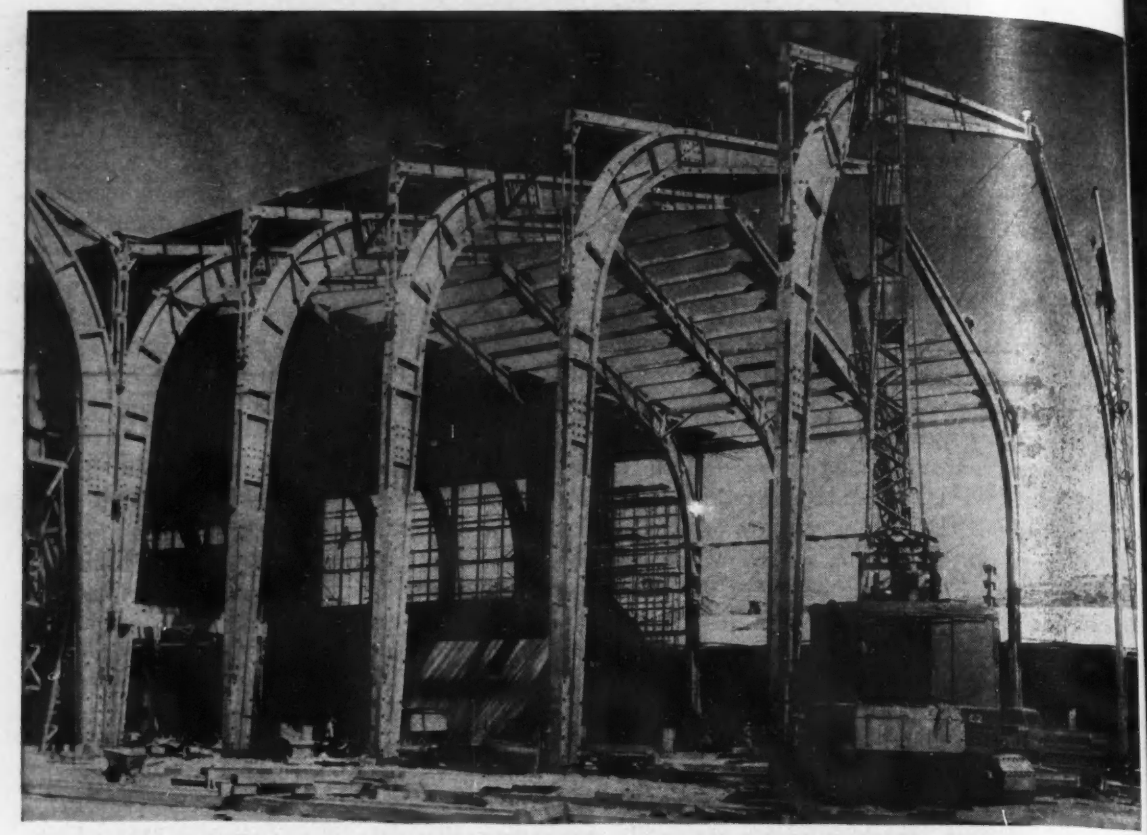


Fig. 1. Each half of the timber arch was lifted to place by a crane and held while workmen made top connection.

Pioneer Design in Laminated Wood I-Beams

S. B. Barnes
Consulting Structural Engineer
Los Angeles, Calif.

***Contents in Brief**—Three-hinged arches of 120-ft. span with a rise of 72 ft. were made of laminated timber built up into an I-beam or double channel section for a wartime industrial plant. Bow string trusses of the conventional type with high side-walls and columns were considered; an analysis, however, showed that the former type of construction offered cleaner lines and, considering secondary savings, was no more expensive. Beam depths reach 49 in. at the point of maximum moment.*

AN INDUSTRIAL PLANT 120 ft. wide with a clear height of about 72 ft. was required to facilitate the manufacture of war equipment. Ordinarily, a building of this type would have been designed for a structural steel frame, but with steel classed as "highly critical", it was found possible to develop a laminated timber design, which has proved satisfactory.

The building floor plan as a whole called for a 248x740-ft. structure but there was no objection to a row of columns down the center; hence the selection of a two-span structure consisting of parallel arches, each with 120-ft. clear span. The considerable height at the center was specified to permit the use of self-propelled traveling cranes for erection.

In the preliminary analysis of possibilities with timber construction, choice was narrowed to (1) bow string trusses of the conventional type with high sidewalls and columns or (2) a three-hinged, glued laminated timber arch. The latter had the advantage of cleaner lines and, considering secondary savings, was no more expensive. Furthermore, slight settlements of foundations would cause but little stress change in a three-hinged arch as compared to the effect of a shifting foundation under a two-hinged arch. Settlement was a factor because at this site the foundation was not good and footings had to be supported on piles.

There was available to the design-

however, considerable informa-
on relatively simple, glued lam-
d structures, including curved
chords and small arches. Con-
rable research had been done on
general subject by the Forest
ducts Laboratory of the U. S. For-
Service. Summerbell Roof Struc-
, Los Angeles, had built a num-
of sizable structures of this type
was willing to collaborate in go-
further.

he design finally adopted was the
e-hinged arch having a laminated
am section with a web 6 in. thick
flanges 14 in. wide. The depth
he section varies from 24 in. at
lower hinge to 49½ in. at the point
naximum moment, reducing again
bout 18 in. at the center hinge in
crown of the arch.

he legs of the arch rise vertically
height of some 35 ft. and then
ve toward the center hinge on a
ius of about 25 ft. After making
bend, the top flange of the arch
follows the roof pitch to the center
ge, which is 72 ft. above the other
hinges.

he design provides for a wind
ssure of 15 lb. per sq. ft. of hori-
tal projection or a seismic factor
0.1g, whichever governs. Verti-
live load is figured at 20 lb. per
ft., reduced to 17 lb. for the arches
mselves. Also, provision was made
a load of 1,000 lb. to be attached
any point along the arch rib.

he great height of the structure
de wind a governing factor in the
ection parallel to the arch ribs.
ntiguous arches are set side by side

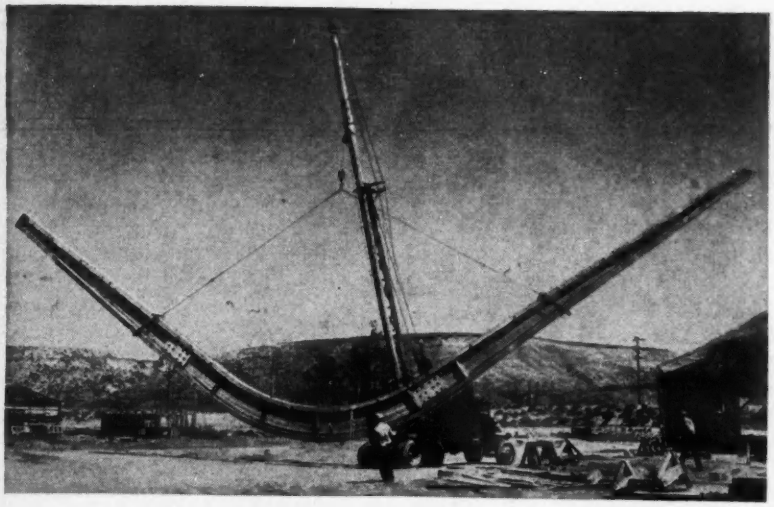


Fig. 2. The arch ribs were picked up and moved to the plant site in this manner.

with only 6 in. of separation and each arch was figured for the full wind load as though independent of the other. This took care of possible later developments with one structure removed and the other left standing.

Vertical bracing in a longitudinal direction was carried through this separation of the two arches forming a partial tie between them. The roof also formed a tie and served as a diaphragm to distribute lateral forces to the vertical elements. A double mezzanine floor immediately adjacent to the two center arch legs complicated the seismic analysis by producing a thrust into the center legs at these floor levels.

The size and weight of the members to some extent dictated the fabrication plan and methods of erection. Since glued material must be placed under controlled pressure in the clamps within a limited time after glue is applied, it was not possible to glue up even half of an arch in one operation. Each half of an arch was made up in three pieces consisting of the two flanges and the web; these three to be later glued together into one piece. The initial gluing was done in the manufacturer's main plant and the three pieces were put together in a specially constructed field plant at the site.

At the outset it was planned to scribe the contacting curved faces of the sections to a nearly perfect fit. Then, by providing a cushion of three 1-in. laminations between flanges and

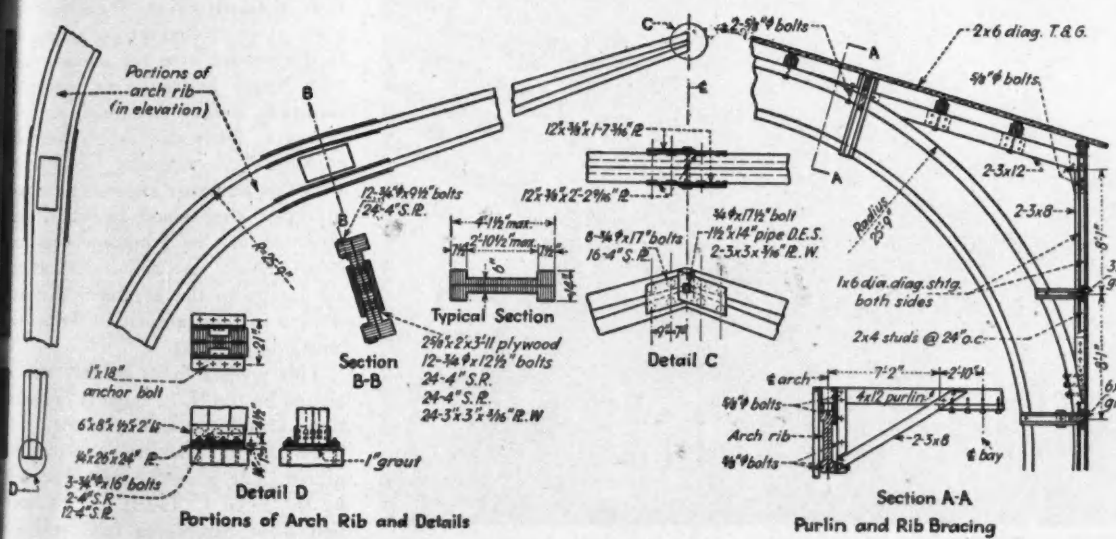


Fig. 3. Portions of the beams and typical cross-sections of laminated timber frame construction for an industrial plant.

web which would be incorporated when flanges and webs were glued together, it was believed that a satisfactory bond would be effected by the glue.

This plan did not work out as had been hoped. It was found that the individual parts were so stiff that when clamped together in the final gluing operations any misalignment that had developed in shipping or from other causes, created bending stresses that pulled the fibres apart when clamps were released. The resultant cracks would occur in the wood fibres as often as in the glued face. This was overcome by re-scribing each piece to a perfect fit after delivery to the field assembly plant. Special jigs and shapers were made for this operation. When the parts were exactly fitted to curvature just before being joined, the glue bond was found to be satisfactory and no further trouble developed.

A charted record was kept during all operations giving the temperature, relative humidity of the air, type of glue, time of setting, etc., with a view to making adjustment where necessary.

As indicated on the accompanying drawing, the section was made up entirely of 1- and 2-in. material, scarf spliced and glued together. Main splices were located at points that would simplify shipping from the factory to the field assembly plant. Web splices were made with plywood gussets and split ring connectors. Flange splices were made with steel plates at top and bottom of both flanges connected to the timber with shear plates.

Lower hinges resist thrust

The lower hinges, which are really not hinges at all, consist of a bearing plate attached to angles of a size such that with appropriate shear plates for connection to the timber of the arch, the required horizontal thrust can be taken safely. The upper hinge consists of steel side plates bolted, with shear plates, to the timber flanges. A pin extends through the four plates. The lower flange of the arch is knee-braced to the wood purlins to stiffen that portion of its length under compression.

The three segments of which each half-arch is composed, were brought to the field assembly plant on trailers and there put together in jigs and clamped firmly until the glue hard[ened]. Each half of the arch was lift[ed] to place by a crawler crane in man[ner] the same manner employed in hand[ling] structural steel. Care had to b[e] exercised to avoid high erectio[n] stresses in picking up and turning over the half arches.

Cracks and deflection

Detailed inspection of the structure some time after completion of the building showed a few cracks in the web near the flanges parallel to the axis of the arch. These cracks were usually 2 to 6 in. from the inside face of the flanges, sometimes in the glued faces and sometimes in the individual pieces. They were mostly less than 18 in. long but one or two were approximately 6 ft. in length. No cracks occurred in opposite halves of the arch at a corresponding place. Nevertheless, splice plates were made up to extend across the cracks and to strengthen the web sufficiently to develop the horizontal shear value lost through the opening of the cracks.

Horizontal deflections at the eave line were measured after completion and were found to be slightly in excess of the computed deflections. Perhaps, some authorities would attribute this to plastic flow. As this was written the structure had successfully withstood several strong wind storms. The wind velocities are not known but weather bureau records in a nearby city show a maximum of 43 m.p.h.

Experience with these laminated arch ribs has suggested the possibility of further development of this same type of construction. With improved glues of controlled setting periods affording more time for assembly and with better hydraulic or pneumatic clamping devices developing uniform pressure, fabrication costs could be considerably reduced. Experience with this structure suggests no reason to doubt that glued laminated construction acts as a homogeneous section. There is definite structural advantage in the assurance that any defects in one lamination do not extend into the next.

This project in its entirety was designed by the H. L. Gogerty organization, architects and engineers, with the writer as consulting structural engineer. The general contract was held by the Ford J. Twaits Co. Summerbell Roof Structures fabricated and erected the structural frame.

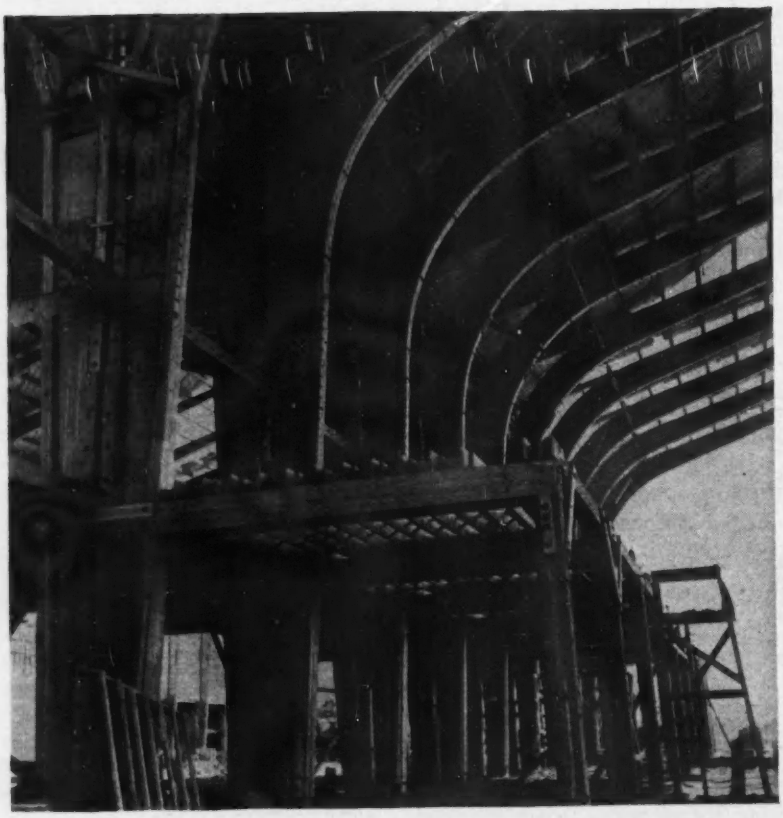


Fig. 4. An interior view along the center line between the parallel rows of arches.

Hughes Co. photo

1. A 17-ft. brick baffle wall separating the intake and the outlet gates is designed to prevent water stagnation.

Water Storage for the Nation's Capital

***ntents in Brief**—A 10-mg. reservoir is being built in Washington, D. C., an open oval-shaped structure but with provision for future construction a roof that will be used as a recreational site. The floor and side slopes are ing paved with an 8-in. concrete slab constructed with expansion joints a type new to water supply work in the District of Columbia. Stagnation water in the reservoir will be prevented by a high brick baffle wall of rpentine design, which is expected to provide great stability.*

CURING PRIORITIES for construction terials in the nation's capital, at very headquarters of the war agen- of the federal government, in- lves just as many perplexities as projects elsewhere in the United tes. This at least was the experi- ce of District of Columbia engineers gaged in the construction of a 10- g. oval-shaped storage reservoir in southeastern part of the city of ashington.

Known as the Fort Stanton Park servoir, the critically needed project s delayed several months before the cessary approval to start work was ceived. Moreover, the War Pro- uction Board first requested that no einforcing steel be used in the con- ete lining and the initial plans were epared with this in mind; shortly efore bids were taken, however, the eel problem eased sufficiently to per- it the use of some reinforcing. nother restriction was that the roof e omitted for construction at a later date. Because the original design called for the sidewalls to end 3 ft. below finished ground level, the restriction that the roof be constructed later required that the sidewalls be built 7 ft. higher than originally planned, the extra height to be torn away when the roof is added (Fig. 2). The critical materials problem also resulted in the use of construction joints of a special design. (See detail Fig. 2).

The construction site is located on top of a hill of sufficient elevation to permit the reservoir to be built as a large oval-shaped bowl. To accommodate the structure it was necessary to remove 90,000 cu. yd. of earth. This layout, which called for a level bottom and for sidewalls sloped 1 on 2 for the greater portion of their height, will permit the structure to be covered with 2 ft. of earth after the future roof has been added, and the site used as a recreational area.

Inside length of the reservoir is 413 ft. at the top and 346 ft. at the bottom, while the width decreases from 273 ft. at the top to 206 ft. at floor level. The maximum water depth will be 18 ft. and the overflow level will be 5 ft. below finished ground level.

Concrete lining on natural ground

The structure is being lined with a concrete slab put down on an impervious soil that is predominately blue clay. Because of the nature of this material, a 6-in. dia. open-joint, vitrified clay drain laid in gravel of ¼-in. dia. or larger is provided below the lining where the sidewall and bottom slabs intersect. This drain is expected to eliminate hydrostatic pressure below the slab.

The lining is generally 8 in. thick, but where the columns will be needed later to support the roof (on 20-ft. centers each way), the bottom slab is thickened to 1 ft. 6 in. and the side lining to 2 ft. 9 in. Reinforcing in the lining consists of ⅝-in. dia. bars on 12-in. centers both ways.

Use of admixture specified

To permit a major portion of the shinkage to occur before the closing blocks are constructed, the lining is being built in alternate 20-ft. squares; the concrete of a given slab must be three days old before the adjoining

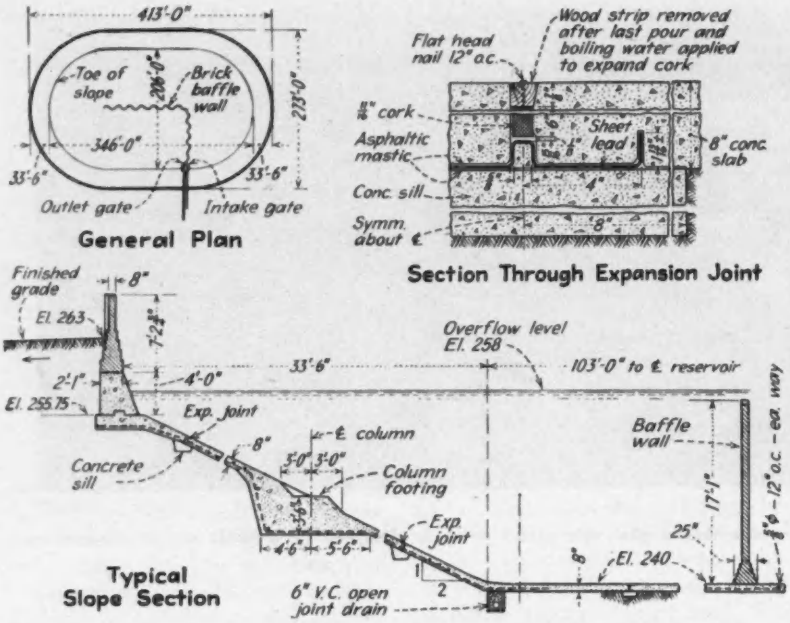


Fig. 2. The normal 8 in. thickness of the sidewall and bottom lining of the oval-shaped reservoir is thickened considerable where columns will be required for future roof construction. Joints of the lining are sealed with lead sheets and self-expanding cork, (top right). A 17-ft. high brick baffle wall of cross section shown at the right and of the serpentine layout indicated in the general plan will prevent areas of "dead storage" in the reservoir.

squares can be built. A concrete designed to have a compressive strength of at least 3,000 psi. at 28 days but actually having an average strength of over 5,000 psi. is being used for the lining. To eliminate all top forms except those needed for shaping the column footings on the side slopes (Fig. 4), the design engineers specified that the concrete be delivered with a 3-in. maximum slump. For greater workability and durability of the concrete, the designers also specified that the mix include a satisfactory cement-dispersing admixture in the proportion of one percent, by weight, of the cement.

The concrete is mixed at the site in truck-mounted mixers and the greater portion is being chuted to the desired point. The concrete for several closing bottom slabs is being delivered by two-wheeled buggies. All the concrete is vibrated in place.

Two methods of curing are employed. A membrane compound applied with a spray is used for the side slope concrete while the bottom slabs are kept covered with moistened burlap for the first seven days, when the burlap is replaced with a shallow layer of sand, which will be kept moist until the reservoir is cleaned for the final filling.

Lead sheet used for water stops

Because of the shortage of copper flashing, a special joint of a type new to water supply work in the District of Columbia is employed for all the construction joints in the sidewall and bottom lining (Fig. 2). A lead sheet 12-in. wide bent on the job with center and outer flanges about 1 in. high is used as the flashing. The sheet is supported on a concrete sill 16-in. wide and about 6 in. thick, and before the flashing is embedded in the concrete it is covered with a thick layer of asphaltic mastic to prevent a chemical reaction between the lead and the concrete. The joint space above the flashing is filled with a prepared, self-expanding strip cork, and boiling water is poured over the cork, which produces the expansion desired.

The added 7-ft. height of the walls is being made of brick because this construction was more economical and could be torn away more easily later. This brickwork, which will extend 4 ft. above finished ground level, will be surmounted by a barbed-wire fence 4-ft. high.

Baffle wall prevents stagnation

Water will enter and leave the reservoir through a gate chamber built into the east wall. The inflow will be through a gate on the north side of a

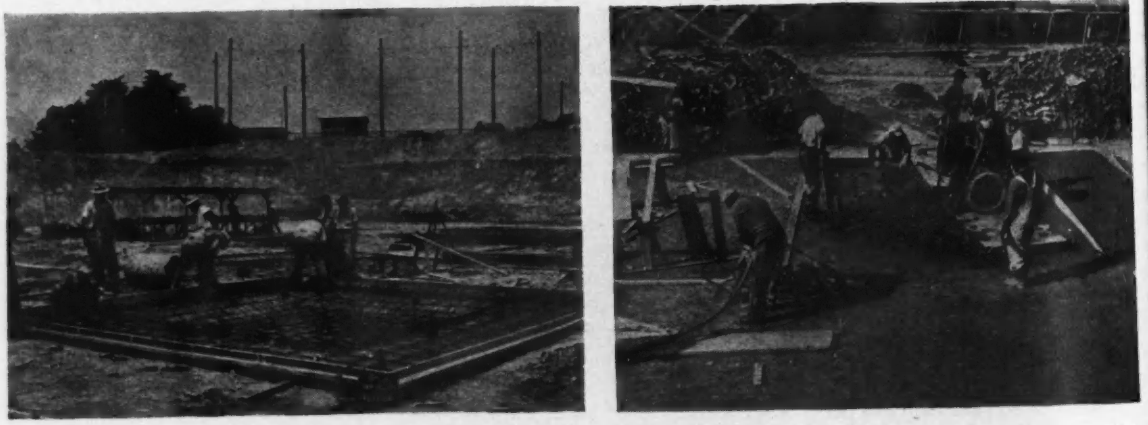


Fig. 3. Where columns will be required to support a future roof addition the floor slab is thickened from 8 to 18 in. Right: Floor slab closures, 20-ft. square, are being built of concrete delivered by rubber-tired buggies, all the concrete being vibrated in place.

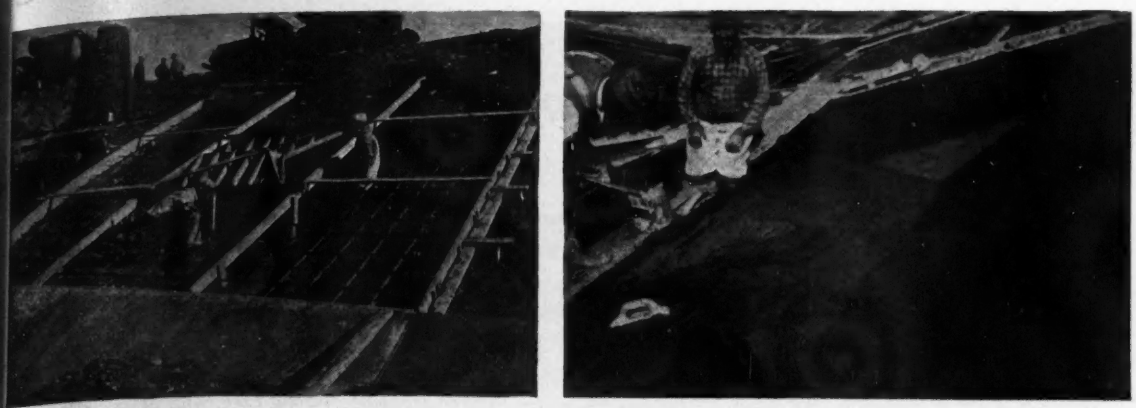


Fig. 4. Excavation for the column footings on the side slopes are carried down sufficiently to provide a 9x9-ft. horizontal bearing area. Use of a low-slump concrete reduces top form requirements to the one-piece pedestal form shown in place in the picture at left. Right: When this form is removed, which is within a few minutes after last concrete is placed, some hand finishing is required.

brick serpentine baffle wall extending about 100 ft. outward from the chamber and then to the left 125 ft., while the discharge will be through a gate on the opposite side of the wall. This arrangement is expected to eliminate water stagnation at any point in the reservoir.

The brick barrier will be slightly over 17 ft. high and for the greater part 8 in. thick, the base being 25 in. wide. The serpentine design of the wall was used to increase the stability of the baffle and to make it more effective in preventing stagnation. Horizontal expansion in the wall is permitted by vertical 1-in. wide openings free of filler and spaced 20 ft. on centers along the baffle.

Those in charge of project

The project, which is expected to cost $200,000, is being carried out by the District of Columbia, Col. C. W. Kurtz, engineering commissioner, Col. J. D. Arthur, Jr., assistant commissioner, and Harold A. Kemp, director of sanitary engineering. For the water division, Humphrey Beckett is superintendent, David Auld, assistant superintendent, Roy L. Orndorff, engineer of design and construction, and R. M. Dowe, construction engineer.

Baltimore Contractors, Baltimore, Md., represented on the project by C. A. Driver, general superintendent, and H. W. Morgan, assistant superintendent, is the general contractor. Whitman, Requardt & Associates, Baltimore, Md., are the designing engineers.

Potential Postwar Engineering and Construction Work in Brazil

The Research Division of the Office of Inter-American Affairs has completed recently a study of potential industrial developments in Brazil, which indicates that a large volume of engineering and construction work will, in all probability, be undertaken in the early postwar years.

The Coordinator of Economic Mobilization recently stated that plans for the industrial development of Brazil would require at least $2,500,000,000 and possibly $4,000,000,000 within the next decade.

Proposed plans include a more complete utilization of the hydroelectric potential of 20-million horsepower (at present only 7 percent has been developed); completion of a coastal system of railroads from the Uruguayan border to Belem and a secondary system to connect coastal with interior railroads; a highway network program; further expansion of the iron and steel industry; mechanization of agriculture, using modern techniques and equipment; an extensive public works program, and development of mining and metallurgy. Expansion in the production facilities for textiles, cement, chemicals, glass, paper, electric equipment, food processing, aircraft, rubber and a variety of consumer goods is also contemplated.

Although many of these projects are in the blueprint stage, others have already been initiated, orders placed and construction started.

With steel as a foundation, Brazil is developing a program of industrialization designed to revolutionize its economy. The steel mill project at Volta Redonda, costing $75,000,000 is nearing completion, and will utilize high grade ores from Bello Horizonte. It is estimated that this plant will be capable of producing 750,000 tons of steel annually. Brazil has 25 percent of the known iron ore reserve of the world.

Possible development of new plant facilities in Brazil will require machinery and equipment with an estimated value of $1,307,000,000, and that the replacement of depreciated and obsolete equipment will likely require an additional $719,000,000.

Estimated value of new and used equipment and materials that will be required for the first 10-year postwar period is given in the accompanying table.

Type	Cost In Millions of Dollars Used	New	Total
Power and Communication	69.2	474	543.2
Transportation	155.7	385	540.7
Building construction	69.2	120	189.2
Manufacturing	121.2	240	361.2
Agriculture	69.2	150	219.2
Mining and petroleum	13.9	18	31.9
Lumbering, woodworking and paper	5.2	11	16.2
Fishing	3.5	8	11.6
Scientific apparatus	41.6	24	65.6
Consumer goods	17.3	30	47.3

Railroad Tunnel Roof Rebuilt from Shaft

***Contents in Brief**—Timber supports for a 528-ft. length of faulty brick arch lining in the old double track Kingwood Tunnel on the Baltimore & Ohio main line at Tunnelton, W. Va., restricted clearance of new locomotives and wartime freight traffic. To eliminate this bottleneck the railroad decided to replace the old brick roof with a concrete arch, but specified that the contractor must not let the work interfere with trains or block the tunnel. A clever method of attacking the job from on top, by means of a shaft and crown drift driven above the damaged section, was developed by the contractor. The arch is enlarged by excavating sideways from the drift, while timbers are posted to the old lining below. Then new concrete haunches are poured behind the old lining, a segmented arch timbering system is installed to free the working area of posts, and the new concrete arch is placed after the top section of brick has been removed. All areas above the segmental timbering are carefully backpacked with old brick. Ventilation by a pressure fan keeps the workings clear of smoke. All concrete is pumped into place from a plant at top of shaft.*

By ingenious tunneling methods, Bates and Rodgers Construction Corp. of Chicago is replacing a failed section of brick arch lining in the old double-track Kingwood Tunnel on the Baltimore & Ohio main line at Tunnelton, W. Va., without interfering with heavy war time traffic. From a crown drift driven on top of the old lining from a shaft sunk from the surface, the contractor is cleaning out a zone of broken and faulted rock, is tearing out the old arch lining and is building a new concrete arch in its place while the big mallets and their long drags roar unmolested through the tunnel below.

This plan, simple in conception but difficult in operation, meets the two basic requirements set up for the job: Tunneling procedure must (1) preclude any possibility of further failure of the damaged arch section or of a rock fall that would block the tunnel; and (2) not interfere with or delay train traffic. To meet these conditions requires constant vigilance and painstaking care, with every move planned in advance. On most tunnel projects a rock fall or loss of ground is merely an inconvenience that delays progress; here either one would be a major catastrophe. Remnants of abandoned coal mining workings 20 ft. above the tunnel roof also complicate the situation.

The Kingwood double-track tunnel, 0.9 miles long, was completed in 1910, supplementing a single track tunnel alongside that was started in 1849, finished in 1857, and is still in use. Both tunnels are at the top of a long 2 percent upgrade from the west. The grade breaks at the east end of the small bore and about midpoint in the double-track tunnel. Ventilation in the single-track tunnel is restricted by the size of modern motive power, and because this tunnel is on a continuous grade it is not used by eastbound trains except in an emergency. Smoke conditions are also bad in the tunnel, for the big mallets must pass through under full steam required to drag the long freights upgrade.

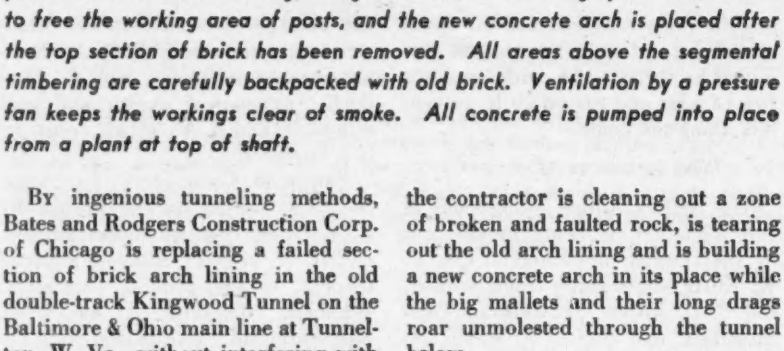


Fig. 1. Access to the railroad tunnel roof repair job was from above through a drift driven along top of crown over the failed lining section. This view is looking through the shaft cage toward west heading. Note the large vent tube.

Old arch failed in 1926

As originally built, the double-track tunnel was lined with concrete sidewalls up to the springline 9½ ft. above base of rail. The roof is a semicircular five-course brick arch, 2 ft. thick, supported by the concrete walls. Original clearances were 31 ft. 4 in. wide and 25 ft. high above B/R.

In 1926 a 528-ft. length of the brick arch lining cracked and failed though none of it actually fell out. The haunches kicked up at the quarter points a maximum of 9⅛ in., while the crown sagged as much as 18 in. This movement opened up the arch at the springline and crown, the maximum gap at the latter point being 3⅝-in.

The failed section was immediately shored up with an elaborate timbering

tem consisting of bents of 12x12- timbers spaced from 16 in. to 4 ft., ped longitudinally with 12x12- stringers placed skin tight. Each t included a T-shaped support set ween the tracks, stiffened by tim- arches carried from the outer ends the T cross member down the sides the tunnel to subgrade. This shor- , of course, greatly reduces the nel clearances, but trains have been erating through this tight hole for years.

Lately, however, the restricted tun- section has become a handicap to motive power, larger than ever fore used on the railroad, and a ttleneck to free movement of heavy rtime traffic. Therefore in Decem- , 1943, the railroad decided to go ead with the necessary repairs and rk actually started late the follow- month. In general, the idea was replace the crown of the old brick ch, from quarter point to quarter int only, with a brick-faced con- te arch, retaining the original brick ing on both sides from springline to arter point. Even though the lower ments had moved outward at the , they were in good condition. All d packing and loose rock was to be moved, the haunches back of the ickwork remaining in place were to filled with concrete, and all remain- space above the new concrete arch s to be packed carefully with old ick. Details of procedure were to worked out by the contractor and e railroad engineers.

Work starts with shaft and drift

As the contractor had elected to do l work from the top, the first step as to sink a 11x14-ft. shaft 130 ft. ep from the surface to top of crown the tunnel arch, tapping the center the damaged area. Because the aft penetrated various formations of od and bad ground, including coal ams and part of the old mine, it as carefully timbered throughout. ts of 10x10-in. timbers, lapped and erlapped at the ends to take thrust th ways, were placed every 5 ft. d full sheeted with 3-in. lagging. ross struts divide the shaft timbering to two compartments, one for a cage istway, the other for a manway and r utilities. A 35-ft. timber headframe rmounts the shaft.

Once the shaft was bottomed the ext step was to drive a 6x7-ft. drift long the ridge of the old brick tunnel

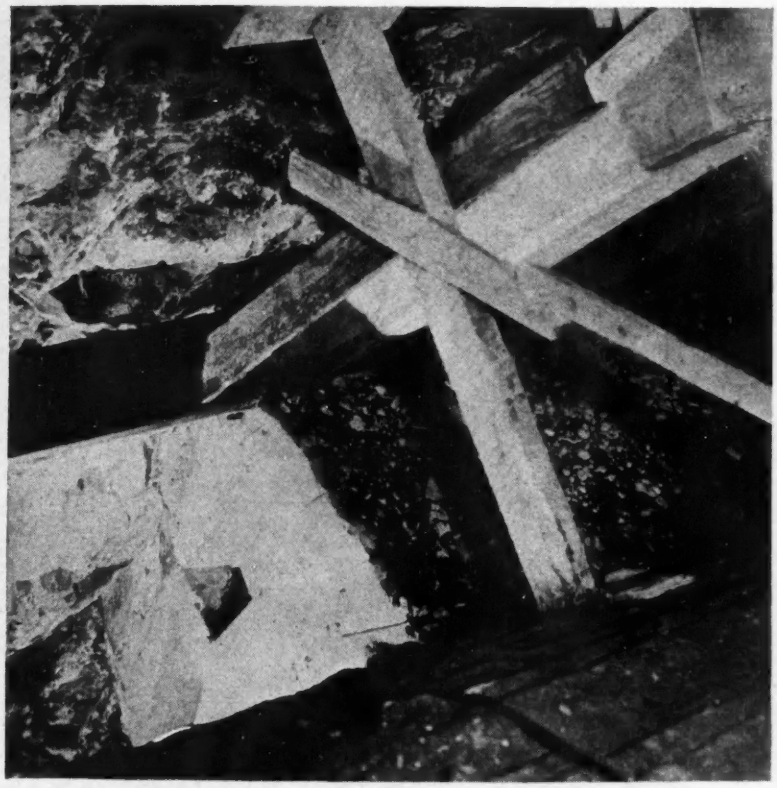


Fig. 2. Concrete haunches poured behind old lining just above springline support wall plates (left center) that carry segmental timbering over working space.

arch in both directions to the ends of the failed section. Driving of the drift proceeded with extreme care and caution. Square timber sets were placed every 4 to 5 ft., supported on cross sills resting on the top arc of the brick arch and blocked to the tunnel lining at the ends. A solid wood floor carries a narrow-gage track. Every foot of the drift was driven with crown bars (heavy timber spiles cantilevered from one set to the next) holding the roof to preclude any possibility of a rock fall. Much of the ground encountered was broken or faulted. The drift sides were also lagged in bad ground. Drilling was largely with jack hammers and shooting was light to lessen chances of injury to the tunnel below. All mucking was by hand into dump cars pushed to the shaft and hoisted to the surface.

Arch excavated from drift

Excavation for the new concrete arch and placing of concrete started at the ends of the drift and are proceeding simultaneously in both headings toward the shaft at the center. Work is being carried on by steps, each step including 10 to 15 ft. of tunnel length. At the time of this writing the job is about one-third completed, so the sequence of operations has been fully established. As work progresses, there is always some 40 ft. of arch open at each end of the drift.

Inspection revealed the old timber support system within the tunnel is still in fairly sound condition and capable of supporting a heavy load. Therefore, the arch excavation is being done under the protection of timbering temporarily posted to the old brick masonry.

The first step in excavating for the new arch is to open up a section 10 to 15 ft. long at the sides of the drift. Started with a cut 7 ft. high above the old arch at the drift walls, the excavation is widened out down the curving top of the brick masonry to just above springline. While the excavation is carried high enough to remove all old packing, broken and loose rock, an attempt is made to narrow the cut to about 3 ft. thick at the bottom. Excavation is carried on from both sides of the drift at the same time. For the first 8 ft. out from the drift walls the

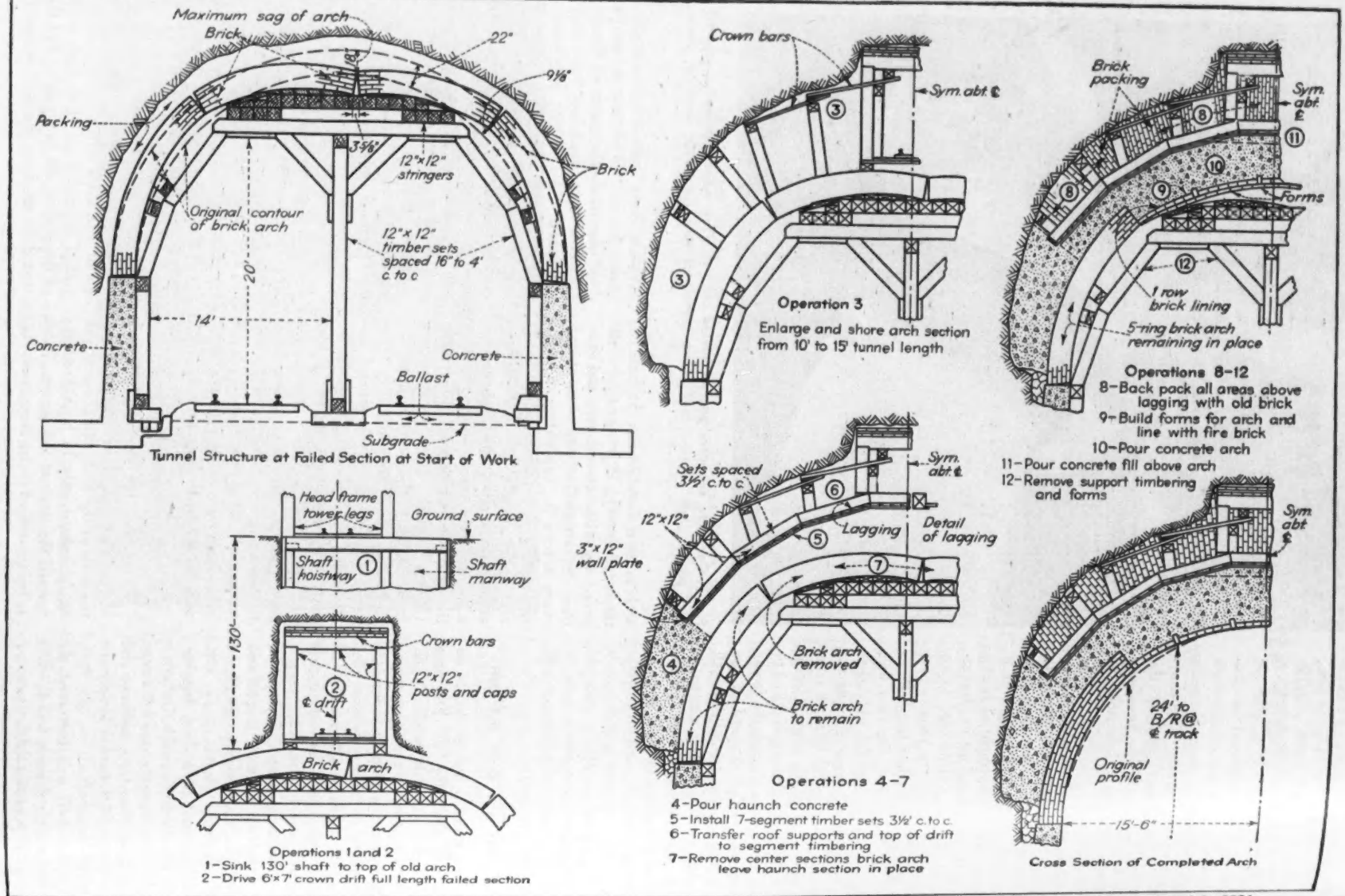


Fig. 3. Step by step procedure in replacing top half of brick arch lining with new concrete roof. Timbering system supporting failed section of arch was placed in 1924.

Fig. 4. Lagged segmental timbering supports roof of enlarged area over old lining while top half of brick arch is removed and replaced with concrete. During enlargement excavation and pouring of haunches the roof is posted to old lining, as shown in background. Later roof supports and top of drift timbering (right) are transferred to segmental timbering. Every move is made with care and all operations are manual.

cuts are driven with two sets of crown bars. The timbering for this area is two sets placed parallel with center line of tunnel, consisting of caps carried by posts set normal to the arch line. Beyond the second set of timbers crown bars are not needed, but the curving roof is well braced with posts and caps. Excavation is slow and painstaking work. Shooting must be light, and all muck is laboriously relayed by hand into cars in the drift.

This first operation leaves an arched chamber 10 or 15 ft. long, 7 ft. high at the drift wall line and 3 ft. wide at the bottom, with the roof supported by a system of timbers posted to the old tunnel lining. The next step is to pour the lower parts of this chamber, behind the haunches of the brick lining, full of concrete to a radial construction joint about 8 ft. above springline. A 3x12-in. wall plate for future timbering, carefully set to line and grade, has been previously placed at the construction joint and the concrete is poured up to these wall plates on both sides of the arch.

After the haunch concrete has hardened, the next step is to erect clear-span timbering, each set made up of seven segments of 12x12-in. timbers, from wall plate to wall plate. These sets, roughly clearing the old arch by 5 ft., are spaced 3½ ft. c. to c. Then the caps and crown bars supporting the roof are blocked up from the segments and the posts removed. The side posts of the drift are also cut off and blocked to the segments and the drift floor is removed, leaving a clear working space from haunch to haunch beneath the segments.

The segments are lagged with 2-in. lumber carried on nailing strips fastened to the sides of the timber to form a tight roof. Then all space above the lagging, including the upper part of the drift area, is carefully backpacked with brick removed from the old arch.

Removal of old brick masonry

The section is now ready for removal of the old brick masonry in the top part of the tunnel arch, from quarter point to quarter point. As fast as the masonry is broken up with pneumatic concrete busters the bats are handed back to the crew backfilling above the segmental timber. Beneath the brick arch is the solid timbering of the tunnel below, which makes a good working platform for setting forms for the concrete arch.

These forms are simply longitudinal lagging carried on curved cross ribs which, in turn, rest on the tunnel timbering. On top of the forms is placed one course of fire brick, which will protect the concrete arch from locomotive blast. After the brick is in place, the section is filled level with concrete 3 ft. thick at the crown. The next and final pour of concrete fills the remaining space below the segmental timbers. This last operation completes the work in the section, for the arch is now completely closed and all voids above the concrete have been backpacked with brick.

Arch forms and the tunnel support timber system will remain in place until the work is complete, then the forms and supports will be removed from within the tunnel. The shaft eventually will be backfilled.

The various steps outlined above are carried out in sequence, section by section, so a considerable length of working chamber is open at one

Fig. 5. Forms for new concrete arch (foreground) are carried on old timbering system in the tunnel below. One course of fire brick is placed over forms as lining for the new arch. Concrete in background is completed section of tunnel.

time at both ends of the drift. Work is slow, for every move must be made with care, and all operations must be done by hand.

Men could not possibly work in the headings if the job were not well ventilated, for frequent trains keep the tunnel full of smoke. A high-speed 48-in. centrifugal fan, operating at 1,150 r.p.m., with a 50-hp. motor, delivers 15,000 c.f.m. of ventilating air from the surface down the shaft through a 26-in. steel pipe. At the shaft bottom the vent line divides into two 16-in. fabric tubes, one to each heading. These vent tubes are carried into the working chambers at the ends of the drift, where the ventilating air is discharged at a pressure of some 2 lb. per sq. in.

Working area air kept clear

This excess pressure keeps the workings clear of smoke except during passage of trains. Locomotives pounding up the heavy grade blast smoke and gas into the working area through holes and openings in the old timbering system. A watchman within the tunnel warns the crews by whistle at the approach of a train, and all men leave the working chambers to take refuge in the drift. Tight swinging doors are maintained at the ends of the drift that keep most of the smoke out of that area. Within a couple of minutes after passage of a train the high pressure in the working chambers has forced the smoke back into the tunnel. Ventilation in the drift is aided by cracking a few valves on the high pressure air line.

All concrete pumped

All concrete is pumped directly into place from a mixing and pumping plant at the top of the shaft. The drop pipe at the bottom of the shaft can be quickly hooked up to feeder lines to deliver concrete to either heading. Pumping offers a flexible and satisfactory arrangement for placing concrete in the haunches, the main arch and the backfill above the arch in both ends of the project.

The plant at the top of the shaft includes mixing equipment charged by crane and clamshell, discharging concrete directly into the agitator hopper of the pump. Aggregates are delivered by rail to a spur track west of the tunnel. Here the materials are dumped into a pit and hoisted to a truck-loading hopper by a chain and bucket elevator. Trucks haul the sand and gravel a mile to the mixing plant.

Other equipment located at the top of the shaft includes the ventilating fan, three diesel portable compressors for the high-pressure air, and a electric cage hoist.

The project is under the direction of the Baltimore & Ohio Railroad engineering department, A. C. Clarke, chief engineer. W. W. Gwathmey, Jr., as regional engineer, Baltimore, is in direct charge, assisted by G. E. Norris, assistant engineer at Clarksburg, W. Va. Harry Craig is field engineer on the job for the railroad.

For the contractor, Bates & Rogers Construction Corp., Chicago, James Strong is project manager, John Gullans is tunnel superintendent and S. E. Winks is engineer.

Completion expected soon

Shaft sinking started March 9, 1944, and was completed June 6. Driving of the crown drifts was completed Aug. 22 and the first concrete was poured Aug. 30. Because of the slow nature of the project, work will not be finished until next March or April.

Basin Cleaned By Electric Suction Dredge

Engineers of the Philadelphia, Pa., water bureau were recently faced with the problem of removing some 420,000 cu.yd. of mud from the sedimentation basin of the Torresdale pumping station while the basin remained in operation. In such operations a sedimentation basin is usually taken out of use, but it was recognized that this would be impossible at Torresdale, which supplies a great deal of Philadelphia's drinking water.

A scheme was finally devised for cleaning out the mud by means of an electric suction dredge. The dredge stirred up the silt and mud and then drew the mixture into a large pipe, through which it was pumped to a dumping ground.

The problem was to get the dredge into the bed, which is separated from the Delaware River by a dike. A gap was made in the dike and the dredge floated in, after which the gap was sealed. An electric dredge was decided upon to prevent contamination of the water by oil used in other type dredges.

The mud and silt removed was said to represent an accumulation of 27 years.

Contract for the job was handled by the Eastern Engineering Co., of Atlantic City, N. J.

The plan was worked out by John H. Neeson, director of public works, and Martin J. McLaughlin, chief of the water bureau, Philadelphia, Pa.

A New British Road Tar Specification

H. E. Gillander
Technical Department, Koppers Co., Inc., Tar and Chemical Division
Pittsburgh, Pa.

***Contents in Brief**—The result of extensive research, British Standard 76:1943, covering tars for road work, published in 1943, includes points worthy of consideration by American highway engineers. An essential feature of the new British specification is the division of road tars into three general groups, based on rates of setting upon exposure, and further subdivision according to consistency. Although a combination of sound construction practices and one type of tar having closely controlled characteristics appears more desirable than a multiplicity of tars as specified by British Standard 76:1943, nevertheless, this new specification should insure a more uniform and durable road tar than standard American specifications provide.*

DEVELOPED AS A RESULT of an extensive research program carried out over a number of years by members of the British Road Tar Association and the British Department of Scientific and Industrial Research, British Standard 76:1943, covering tars for road construction, was published in 1943. Because it includes a number of features which deserve consideration by American highway engineers, the new specification is compared in this article with corresponding American requirements with a view towards indicating which portions of it may be used to advantage in the United States.

Before examining details of the specification, it is advisable to consider differences in conditions in Britain and America which may have influenced the development of road-tar standards in these countries. Of prime importance is the difference in climate. The British Isles never are subjected to the extremes in temperature common in the United States. In London, the lowest temperature ever recorded was 9 deg. F., and the yearly variation in mean monthly temperature from 1871 to 1920 varied from 23.8 deg. in Greenwich to 17.7 deg. in Aberdeen. In the United States, winter temperatures of less than zero are common, and the yearly variation in mean monthly temperature from 1871 to 1923 was 60.2 deg. at St. Paul and 49.2 deg. at New York. The higher American summer temperatures are reflected in such actions as "bleeding" or its opposite, "penetration." The lower American winter temperatures produce more extensive frost damage and induce greater loss of surface cover than would be expected to occur in the British Isles.

Sources of road tar

Differences in the types of crude tars available also must be considered. The British supply consists almost entirely of high-temperature coke-oven tar and of coal tar produced in gas works, the latter including horizontal-retort and both continuous and intermittent vertical-retort tars. It is estimated that tar produced from continuous vertical retorts comprises 50 percent of the total gas works tar.

The main American supplies are coal tars and light and heavy water-gas tars. Coal tar produced in high-temperature coke ovens has been used in the preparation of road tars in this country for many years and its suitability is unquestioned. On the other hand, coal tar produced in gas works has become uncommon in America in the last decade but is still available in certain sections, such as New England.

A brief review of the characteristics of gashouse tars is desirable. There are two main types, depending upon the method of production: hori-

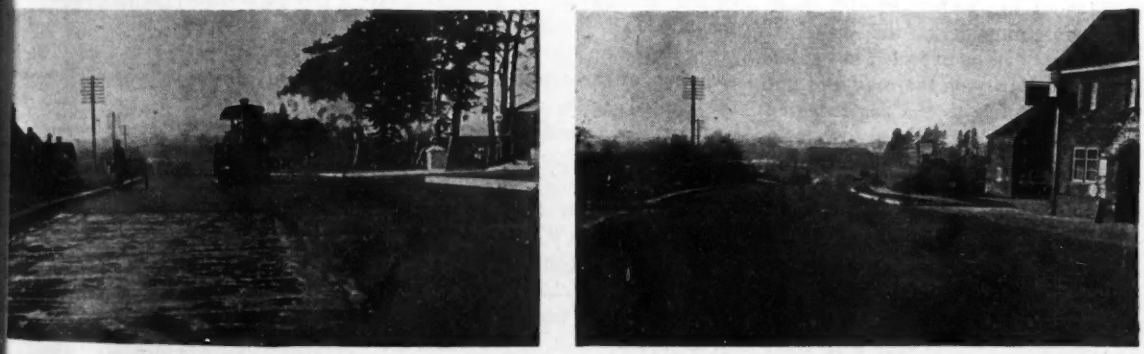


Fig. 1. British bituminous construction is limited almost entirely to penetration construction, premix macadam, thin, one course premix, and surface treatments. Above, the Folkstone-Charing Road in England is shown during and after completion of paving with a thin tar carpet (one course premix).

TABLE I—BRITISH STANDARD 76:1943 AND AMERICAN SOCIETY FOR TESTING MATERIALS SPECIFICATION D 490-4

GRADE	Consistency: Sp. Vis. E.V.T. at 50°C.	Consistency: Sec. Float at 32° C.	Consistency: Sec. Float at 50° C.	Water: Wt. %	Water: Vol. %	Percent Distillate: 170° C.	Percent Distillate: 200° C.	Percent Distillate: 270° C.	Percent Distillate: 300° C.	Softening Point of Residue R. + B. °C.	Insoluble % By Wt. Toluene	Insoluble % By Wt. CS_2	Sp. Gr. 15.5°/15.5° C.
RT-5 and RT-6	17–40				1.5–	5–		25–	35–	35–70		17–	
British A	13–20	18–39‡		0.5–			1–	12–18	17–28	52–	21–		1.090 to 1.230
RT-7		50–80			1–	3–	....	20–	30–	35–70		22–	
British A	20–27	47–80‡		0.5–		....	1–	9–16	13–24	52–	22–		1.100 to 1.240
RT-8		80–120			0.0	1–		15–	25–	35–70		22–	
British A	27–34	80–140‡		0.5–		....	1–	6–14	9–21	52	23–		1.110 to 1.250
British B	27–34	80–140‡		0.5–		....	0.5–	4–11.5	8–16.5	46–	23–		1.110 to 1.250
RT-9		120–200			0.0	1–		15–	25–	35–70		22–	
British A	34–41	140–245‡		0.5–		....	1–	4–12	7–18	52	24–		1.120 to 1.260
British B	34–41	140–245‡		0.5–		....	0.5–	1– 8.5	5–13.5	46–	24–		1.120 to 1.260
British C	34–41	140–245‡		0.5–		....	0.5	1– 5.5	4–10.5	37.5–	20–		1.120 to 1.260
RT-10			75–100		0.0	1–	....	10–	20–	40–70		25–	
British A	41–48		79–118‡	0.5–		....	0.5–	3– 7.5	5–13.5	54–	25–		1.125 to 1.265
British B	41–48		79–118‡	0.5–		....	0.5–	1– 5.5	4–11.5	48–	25–		1.125 to 1.270
British C	41–48		79–118‡	0.5–		....	0.5–	0.5–3.5	1.5–8.5	37.5–	20–		1.125 to 1.270
RT-11			100–150		0.0	1–	....	10–	20–	40–70		25–	
British A	48–55		118–190‡	0.5–		....	0.5–	0.5–4.5	2.5–10.5	56–	26–		1.135 to 1.275
British B	48–55		118–190‡	0.5–			0.5–	0.5–3.5	2.5– 9.5	50–	26–		1.135 to 1.280

‡ Converted by means of Viscosity-Temperature Chart from "Consistency Measurements in the Coal Tar Industry" by Rhodes, Volkmann and Barie American Society for Testing Materials 1938 — Symposium on Consistency.

zontal retort and vertical retort. Horizontal-retort tar may be considered as "over-cracked" coke-oven tar. A number of years ago, when the supply was more plentiful in this country, horizontal-retort tar was used in "high-carbon" road-tar blends and proved to be a satisfactory road binder.

Vertical-retort tar may be considered as "under-cracked" coke-oven tar. Generally, it has a smaller percentage of tar resins, so that road tars containing it as the principal constituent can be expected to harden somewhat slowly on the road and not develop stability to the same degree as high-temperature coke-oven-tar blends. However, road tars made by blending vertical-retort tar with other tars have been used successfully in New England for many years.

American heavy water-gas tar, generally having lower specific gravity and a higher softening point of distillation residue than coke-oven tar, possesses excellent binding properties. A preponderant proportion of it is produced under uniform conditions and is uniform in character. Light water-gas tar serves as an excellent flux for the thinner road tars.

British use of tar limited

British and American construction practices differ considerably also. Judging from the literature, British bituminous construction is limited almost entirely to "grouting" (penetration construction), tar macadam (primarily premix), "carpets" (thin, one-course premix), and surface treatments. Tar primes, light surface treatments or mixed-in-place construction of the types so common in the United States are not employed ordinarily. Therefore, in the new specification the consistency range of road tars used is accordingly restricted to about the equivalent of American grades RT-5 to RT-11.

The new British specification includes a source clause stating: "The road tar shall be prepared from crude tar produced as a by-product of the high temperature carbonization of coal in retorts or coke ovens."

British Standard 76:1943 divides the road tars into three genera groups, and "this division is relate to their rates of setting on exposure as distinct from the immediate set du to fall of temperature at the time o application, which is a function o viscosity. Type A has the most rapi setting properties; Type C, which i a special material and at presen available in limited quantities onl is very slow setting; and Type B oc cupies an intermediate position. The significance of this arrangemen will be discussed later.

Each of the types is subdivided into several groups according to consist ency expressed as equi-viscous tem perature (E.V.T.), defined as th temperature in degrees Centigrade a which the tar has a time of flow of 50 seconds measured by the standard ta viscometer. In practice, the viscosity of the tar is determined at an appro priate temperature and the E.V.T. found by reference to a table. This system was developed to avoid con fusion arising from the use of various test temperatures.

Each of the grades of road ta

overs a span of seven E.V.T. units. Conversion of these ranges to the American system by use of a viscosity-temperature chart, assuming a temperature susceptibility of 1.2, discloses that they coincide very closely with the American RT ranges. This is brought out in Table I, in which British Standard 76:1943 is compared with specification D490-43T of the American Society for Testing Materials.

British standards stricter

Probably because of British manufacturing procedure, the new specification allows, as indicated in Table I, as much as 0.5 percent of water, even in the higher consistency grades that require considerable heating before application. For example, British manufacturers of road tars distil crude vertical-retort tar to a pitch consistency to remove excess tar acids and to develop suitable binding properties, and then the pitch is fluxed back with tar oils which are not absolutely water-free under plant-scale methods of handling.

Distillation limits in British Standard 76:1943 are given as minima and maxima for the several individual fractions and an additional limit is placed on the total amount boiling between 200 and 300 deg. C. This method of specification compares with the American practice of reporting percentages on a cumulative basis. The two test methods should give results that agree reasonably well on the average. Accordingly, the new limits have been placed on a cumulative basis in Table I, and a comparison with the requirements of specification D 490-43T of the American Society for Testing Materials shows that the British standards are far more restrictive.

For the first time, the British have incorporated in their specification requirements for the softening point of distillation residue. The specification states that this "requirement is particularly useful in excluding unsuitable road tars." Here also, Table I shows that the limits are far more restrictive than those of the American Society for Testing Materials.

Of the other specification requirements, specific gravity is the most important. In this case, British limits are lower than American because a large proportion of vertical-retort tar having a low specific gravity is used in Britain in making road tar. With respect to other standards, British requirements for toluene-insoluble agree fairly well with American limits for carbon-disulfide-insoluble (the reverse of total bitumen), except for grades RT-5 and RT-6. Requirements for phenols (maximum 5 percent) and naphthalene (maximum 6 percent) are included because of circumstances unusual in American experience. In the past, British road-tar blends consisting principally of vertical-retort tar, which contains a high percentage of phenols, caused considerable trouble when applied adjacent to fishing streams because in some instances the phenols were leached from the tar in sufficient quantities to destroy the fish life. Naphthalene restrictions are included for the same purpose. There is no recent record of such effects being produced by American road tars.

Comparison of tars

Of chief interest in the British specification is the separation of road tars into three groups based on *setting properties*. Included are road tars falling in both the American cold-application and hot-application tar classifications.

Cold-application tars, grades RT-5 and RT-6, are used in the United States principally for surface treatments in cool weather and for road mixes of the mulch or dense-graded aggregate types. Generally, these tars contain small amounts of flux oils, and under normal construction conditions some evaporation of lower-boiling oils takes place with a resultant increase in binding power. There are occasions when it may be desirable to increase the rates of set-up of these grades, but when this is so, the American tendency is to employ the quicker-setting RTCB grades. Table I shows that the British Type A, "quick-setting" tar, the only group specified for these consistency ranges, cannot contain as much low-boiling oil as the American RT-5 or RT-6 and, therefore, would set up more slowly than many blends that could be furnished under the American specifications.

Of the hot-application tars, grades RT-7, RT-8 and RT-9 are used for surface treatments and for road mixes. Grades RT-10, RT-11 and RT-12 are used for penetration macadam, tar concrete and surface treatment in the south. With the construction methods commonly practiced in the United States, these six grades develop adequate stability through the process of cooling alone.

In the case of surface-treating tars, for instance, grade RT-7 may be used for application during cool weather.

TABLE II—BRITISH STANDARD 76:1943. RECOMMENDATION ON CONSISTENCY RANGES OF ROAD TARS FOR VARIOUS USES

Usage	Type of Tar	Consistency: Winter — British E.V.T.	Winter — Sec. Float at 32° C.	Winter — Sec. Float at 50° C.	Summer — British E.V.T.	Summer — Sec. Float at 32° C.	Summer — Sec. Float at 50° C.
1. Surface Dressing							
a. For general purposes	A	24–28	64–88		33–35	129–151	
b. Waterbound macadam (first dressing)	A	20–24	47–64		24–27	64–80	
2. Tarmacadam							
a. Base Coats	A	27–30	80–104		33–35	129–151	
b. Wearing Coats to be surface dressed (within 12 months)	A	27–30	80–104		33–35	129–151	
c. Hot Process	A	50–53		146–164	53–55		164–189
3. Carpets							
a. Containing more than 30% aggregate passing 1/8" sieve	A	27–30	80–104		33–35	129–151	
b. Containing 20 to 30% aggregate passing 1/8" sieve	B or C	34–36	140–162		38–30	188–220	
		34–36	140–162		38–30	188–220	
4. Grouting	A	27–30	80–104		33–35	129–151	

Exceptions 1a. Increase consistency up to E.V.T. 38° C. (188 seconds float at 32° C.) for hot weather surface treatments of heavy traffic roads.
2a. and 2b. Increase consistency up to E. V. T. 38° C. (188 seconds float at 32° C.) in hot weather and lower to E. V. T. 20° C. (47 seconds float at 32° C.) in very cold weather.
3b. For medium and open textured carpets on heavy traffic roads in hot weather increase consistency up to E. V. T. 41° C. (79 seconds float at 50° C.)
4. Increase consistency up to E. V. T. 38° C. (188 seconds float at 32° C.) in hot weather.

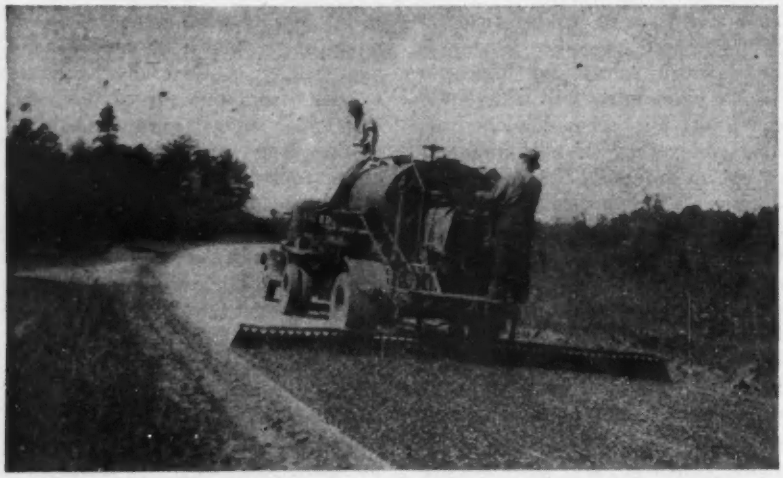


Fig. 2. Illustrative of American practice, a distributor truck is applying a second coat in a double surface treatment.

Rolling and subsequent traffic consolidation cause the cover aggregate to key together so that, accompanied by a small amount of evaporation of lower-boiling oils from the tar, the treatment is capable of withstanding the mechanical action of traffic during the period of warmer weather. The more viscous grades, RT-8 and RT-9, are used for surface treatments during the summer months.

In the case of road mixes, including the one-sized sand mixes common in the south, adequate stability is insured by adjusting the tar content to a point slightly on the "lean" side. Such construction requires a seal coat. A moderate amount of control over the aggregate gradation and tar content of cold and hot-lay premixes is all that is required to produce a stable surface that can be used by traffic immediately after rolling.

Tars for open-graded courses

Examination of Table II, which gives the British recommendations on the types of tar to be employed with various forms of construction shows that Type B and Type C tars are reserved for use in carpets (thin premix courses) of the more openly-graded classifications. In this country, such openly-graded courses are avoided wherever possible, because the porous structure permits weathering action to take place throughout the premix course, thereby producing a less durable pavement. However, when such service conditions do exist, use of Type B and Type C tars would be preferred, because the percentages of distillates and the softening points of distillation residues that are permitted are such as to minimize the evaporation of lower boiling oils which is the principal factor in the aging of road tars.

Consequently, British Type B tars will be more durable and less subject to variation in physical properties than many blends furnished under American RT specifications. Type C tars, while they would be the most durable, may not be suitable for general use under American conditions. For example, a maximum softening point of 37.5 deg. C. is specified for distillation residues from tars of this type. In contrast, the state of New Jersey specification places a 38 deg. C. minimum on the softening point of distillation residues on all RT grades. If used for surface treatments in the United States, Type C tar probably would bleed excessively during the hot summer months unless the gradation and amount of cover material were controlled very carefully.

Applicability to U. S.

The adaptability of these specifications on the basis of American crude tar supplies appears to follow along these lines:

Practically all American road tars in the indicated consistency range prepared from high temperature coke-oven tar will meet the Type A requirements and it is likely that a majority would meet the Type B requirements. Road tars having characteristics of Type C could not be prepared from coke-oven tar generally without resort to special refining processes. In the case of American heavy water-gas tars, more extensive refining would be required than is usually practiced at the present time in order to meet even the least restrictive Type-A limits.

There does not appear to be any data that would indicate that the weathering characteristics of heavy water-gas tars and high temperature coke-oven tars differ. While heavy water-gas tar blends have been widely used in this country in recent years, there is need of additional supporting data to show what types are best suited for American practice. Undoubtedly, a number of state highway departments and other organizations have records that would throw light on this subject.

Conclusions

Although three types of road tars are included in the British specification, Types B and C are intended only for use in thin premix surface courses of open gradations which will permit a maximum evaporative effect. It may be expedient to employ this type of construction on occasion, but American experience has shown that aggregate gradations giving minimum voids and tight surfaces provide the most satisfactory and durable roads regardless of the nature of the bituminous material employed. On this basis, the British system requiring three types of road tar does not appear as practical as one founded on a combination of sound construction principles and one type of road tar adequately specified.

Whatever type tar is to be used, the closely controlled limitations on the characteristics of the road tar given in the British specification deserve careful consideration, for they definitely will assure greater uniformity in the finished product.

It can be concluded that:

1. British Standard 76:1943, covering tars for road construction, should insure a more uniform and durable road tar than standard American specifications provide at the present time.

2. The specification does not offer quicker setting tars as judged from the American viewpoint.

3. A combination of sound construction practices and one type of tar having closely controlled characteristics appears more desirable than the British system involving a multiplicity of tars.

AN ENGINEERING NEWS-RECORD FOREIGN REPORT

Engineering Activities On the Invasion Route in France

Waldo G. Bowman
Editor, Engineering News-Record
(By air mail from the European Theater of Operations)

• From France, where he has been making observations in Normandy, Brittany and the Paris area, Mr. Bowman writes his second report on Army Engineer activities. He tells of the manner in which supplies are being handled to serve the advancing armies, describing some of the highway, railway, bridging and port construction tasks. Mr. Bowman's reports, the first of which was published in the issue of Jan. 25, are designed to provide detailed information to the profession on war-front engineering and construction practice.

FLYING FROM ENGLAND TO FRANCE there is little of the war that meets the eye. As a consequence, it is the topographical and geological singleness of the islands and the continent, clear as a model in relief, that attracts attention. Plainly, France takes up where England leaves off. And the English Channel, washing white chalk cliffs, limestone headlands and interspersed sandy beaches from Dunkirk to Cherbourg and from Dover to Portland Bill, cuts wide the earth to prove it.

Even the fields of the coastal areas of the two countries have a regular irregularity, marked off by hedgerows, that cannot be missed. In this area, bomb craters in the white chalk soil—half filled with surface drainage water—resemble fried eggs with a dark yoke, whether they disfigure Sussex or Normandy.

These physical similarities, including others more significant and detailed relative to harbors, roads, streams and soils, represented one of the important starting points of Army Engineer invasion planning. Moreover, they permitted realistic training in England in beach landings and bridge building, and provided experience in earth handling on airport construction and in repair and maintenance on tar macadam roads that was to prove useful in France.

The facilities to serve the armies, which this engineering training and experience produced, are now spread from La Manche to the Vosges and the Ardennes. To see them one has to begin at their beginning and, as a first step, to follow the invasion route from the beaches to Paris. In a week of travel by jeep, car and train, the 500-mile trip unrolls almost continuous evidence, some latent and a lot still active, of the Army Engineer contribution to the victories so far attained.

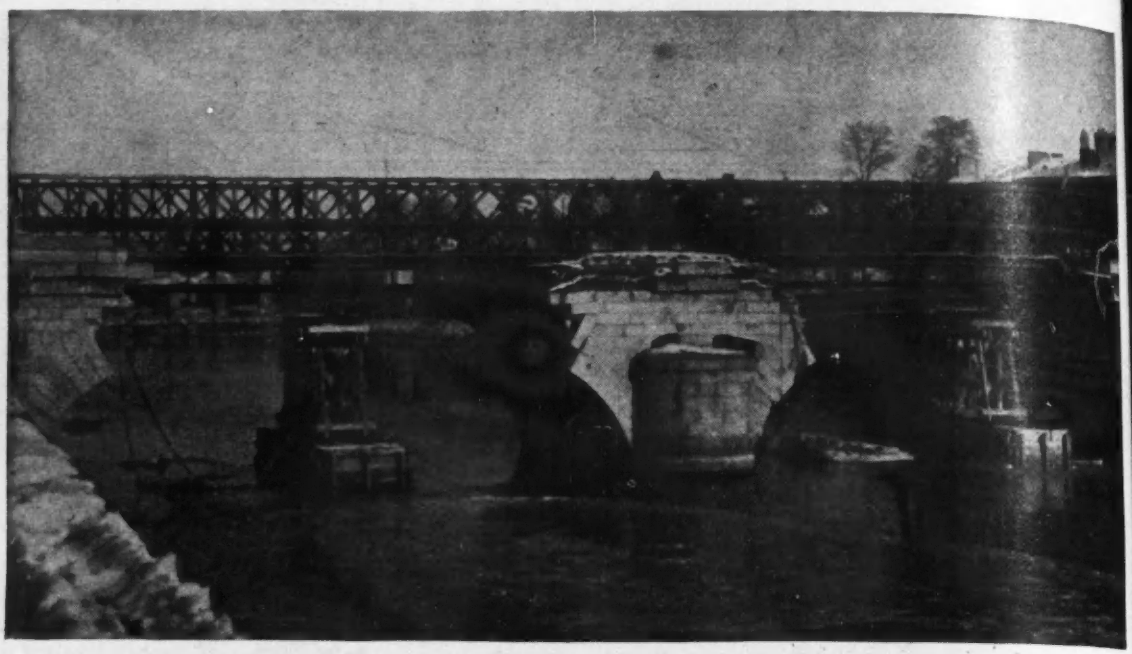
Invasion beaches and Port problems

There will always be two jobs that will be near the top of any list of Engineer achievements in this war. One is that done on the invasion beaches, the other that of converting the shambles that was the port of Cherbourg into a great cargo-handling harbor with a capacity of many times what it had in peacetime. Add to these the equally important, if not so localized, achievements involved in highway and railway bridging, in road maintenance and in camp and depot building, and the list begins to bulk large.

Omaha and Utah beaches

A mingling of inspiration, pride and sadness attends one's first view of the Normandy invasion beaches, code-named "Utah" north of Carentan and "Omaha" northeast of Isigny. Here, the great Engineer Special Brigades, the 1st, 5th and 6th, made history by clearing the beaches, building road exits and then operating the beaches so that supplies moved over them with speed and efficiency, (*ENR* Sept. 14, 1944, vol. p. 320). Here, too, the specially trained Naval Demolition Units, engineers also, and a part of the brigades, did particularly heroic work in removing obstacles and mines below the high water line. And here many died, both Army and Navy, and many more were wounded. At Utah one is reminded of these sacrifices by a 12-ft. shaft of granite atop a German pillbox commemorating those members of the 1st Engineer Special Brigade who lost their lives in the assault. The pillbox was the brigade's command post on D-day.

Offshore, the roadsteads that once were clogged with boats, barges and amphibious Ducks are deserted but still plainly marked by the lines of purposely-sunk ships and concrete caissons that formed the break-



Permanent rebuilding of a French bridge is underway. Blown out by retreating Germans, this two-span structure over Mayenne River at Laval was replaced by one of our Bailey bridges, two in fact, side by side, to permit two-way traffic. Now one Bailey has been removed and the French have built bents to support a four-span I-beam temporary bridge. They will then remove other Bailey sections and begin reconstruction in its place of the stone arches half the width of the bridge. Finally they will remove their I-beam structure and extend the stone arches to full width.

waters of the British-designed and Seabee-installed artificial harbors (*ENR* Dec. 28, 1944, vol. p. 823). The caissons are badly broken, largely a result of unbalanced water pressure as waves, washing over them, filled them and then retreated outside before the trapped water could escape. Nearby, also, lie the twisted remains of the floating bridges over which supplies were to have moved ashore from ships in deep water, but which met disaster in an unplanned for "100-year" summer storm.

Complementing the bleak offshore prospect are the beaches themselves, where only scattered piles of boxes, not yet moved, recall the flood of supplies that came ashore here to support the invasion. The great bulk of supplies found immediate use, but thousands of tons had, also, to be stored in temporary dumps and depots several miles inland. Now, in the dead of winter, getting these supplies out and on their way up to the front has created an engineering problem of some magnitude. It has been called "the battle of mud behind the beaches". It came about as follows:

The pre-invasion plan envisioned only a short operation of the beaches, and it included the establishment of some temporary supply dumps several miles inland, merely to keep the beaches clear. But the beaches were operated for five months instead of just one, during which time the Ducks and landing craft brought in nearly 2,000,000 tons of supplies at Omaha, and over 1,000,000 tons at Utah beach. In one 24-hr. period at Omaha, 13,000 tons were handled, or more than the peacetime capacity of the ports of Brest and Boulogne combined.

Timber and steel roads

One result of this activity was to require that the temporary dumps, located in farm fields be greatly expanded. And as a consequence, they became so big that they could not be depleted before the fall and winter rains came. Then their road systems went bad, and the mud battle began.

Two depots for Engineer supplies, one behind each of the beaches, presented particularly difficult problems. At one of them, when its dirt roads were dry, 1,300 trucks moved in and out in a day, handling 6,000 tons of supplies, which gives an indication of its size. And when the mud shut it down temporarily, its stores totaled 159,000 tons.

The first step in meeting the mud problem was to put crawler tractors to snaking the trucks in and out of the depot. This worked for a time, but it resulted in progressively cutting and wearing the roads down below the general terrain, as much as 5 ft. in some instances, so that after a hard rain, they became canals. Finally, when one of the tractors sank completely out of sight while parked over night, a change in procedure was thought wise, and planked roads were the selected solution.

Two kinds of road were used, one of pierced steel plank, the other of timbers, both being items stored in the depots and both having a high priority elsewhere that had to be ignored if the other supplies were to be moved. In the first depot a single in-and-out road was built, but the necessary one-way traffic made this an inefficient layout. At the second depot loop roads were used, trucks entering at one end and moving right through to the exit.

The foundation used for the steel plank road consisted of a layer of burlap, plus a layer of tar plus three layers of open steel mesh. This pro-

ed a relatively stiff, watertight and ating membrane upon which the rced steel plank could be laid and n welded. Given a relatively high wn, about 16 in. in the 14-ft. road- width, the surface drained read- and was saticfactory if the under- ng mud were not too liquid.

Under the most severe conditions timber plank road was used. This nsisted of 6x12-in. mudsills laid close together as experience dic- ted was necessary, which often eant that they constituted a solid tform. Stringers of 8x8's laid on sills carried a deck of 4x4-in. nk spaced a part for drainage. nally two rows of longitudinal nking, protected on both edges curbs, were laid as a running rface. One of the best roads was ssible along an old hedgerow, hich was cut down and let fall ross the alignment as a mat on hich the timber construction was en built.

In the two depots there are prob- bly three miles of timber road and ne mile of steel plank road. In ad- lition there are several thousand feet f branch hand-truck planked roads ver which light supplies can be heeled to the main arteries. Main- aining roads of this kind is a contin- ous job and an expensive one, but both Capt. J. A. Connor and Capt. Frank A. Ofner, Engineer officers who operate the depots, say that none of these supplies would be going to the front before spring were it not for the planked highways.

Achievements at Cherbourg

When the beaches shut down, and for some time before, Cherbourg was the spout of the supply funnel. Being the first important port to fall into our hands, it gave a preview of German wrecking methods, which as expected were thorough. It also should have provided an opportunity for the Engineers to unfold their pre-invasion plans for rehabilitating the installations, but hardly had we taken it than new plans were laid for greatly enlarged facilities since the ports in Brittany that we had counted on using were not going to be available soon enough.

Rebuilding the port of Cherbourg was, therefore, a far greater task than had been planned for, and the story of how the Engineers and the Navy accomplished it will be covered in a separate article, the censors willing. Here, a few of the things, other than waterfront work, that were required to get Cherbourg into working order are set down as part of the Engineer achievement and as indicative of what is also necessary in Le Havre where our own bombing, added to German demolitions, produced very great destruction, and in Rouen where the city must be made to function efficiently if this greatest of French ports (nearly 10 million tons in 1937 compared to the 6 million recorded for Le Havre and Marseille, which are next on the list) is to serve us effectively.

First of the port problems is power. In normal times the city of Cherbourg and the nearby arsenal got power from two 60-kv., and two 30 kv. lines that came from Caen, one of Normandy's principal distributing stations, by way of St. Lo. For emergencies, a city standby station containing two steam turbine units of 1,500 and 1,200 kw. respectively, and an Arsenal station containing three 1,500 kw. units had been provided.

No power, no port

The war emergency was more than had been planned for. The transmission lines from Caen were destroyed by the Germans, and they and our bombing wrecked the Arsenal power plant. The city station escaped, but a month later both of its generators burned out.

A port without power is no port at all, so stringent measures had to

Typical beach obstacles that line the shores of France Wherever we might have landed, but didn't. All must eventually be cleaned up. These are at Mont St. Michel at the border between Normandy and Brittany.

Plank road in a depot behind Omaha Beach in Normandy permits supplies to be removed from areas otherwise inaccessible because of mud. Trees in background are typical of Normandy and Brittany where the trunks are used to grow faggots to supplement the little fuel available.

be taken. Maj. Gen. Cecil R. Moore, chief engineer European Theater of Operations; his chief of construction, Col. P. D. Berrigan; Lt. Col. R. E. Lawrence, utilities officer; and Col. E. G. Herb, Normandy Base Section engineer and numerous others shared in the headache. The emergency was finally met by effecting an agreement with the Navy to hook a destroyer escort to the city lines. But, in addition, any other type of power unit that would function was called into service; at one time there were connected to the Cherbourg system a 150-kva. captured German diesel electric plant, one of 350-kva. mounted on a railway car, a 250-kva. generator at the Arsenal and two 50-kw. portables at the water plant.

Of the two burned out city units (which were sent to England for repairs) only the 1,500 kw. unit was returned in working order. The French repaired one of the 1,500 kw. generators at the arsenal, and then were able to purchase a 1,100 kw. German machine that the British had captured on a freighter early in the war, so that in the end three good generators were available to supplement the Navy ship.

The permanent solution of Cherbourg's power is now being worked out by the restoration of the Caen line and by tying in with a hydro plant south of St. Lo. Already 100 miles of line are complete, with 35 miles yet to be built. Both Engineer soldiers and French civilians are on the job.

Water supply and refrigerated storage warehouses are two other essentials of a port, and securing these required the exhibition of some measure of engineering aptitude at Cherbourg. At the water treatment plant for example, extra portable chlorinators were installed so as to assure a residual of 0.4ppm. in the distribution system, a requirement not generally recognized in France, but one which was particularly important considering the numerous breaks in the lines and the emergency nature of the repairs.

And since all the warehouse space had been bombed out, the Engineers found three hillside tunnels or caves nearby, assembled some second-hand refrigerating machinery with the aid of the French, and now have a good many thousand cubic feet of "cold room" available. About all that was required was a set of double doors at each cave to form a "lock" entrance and a small building to house the machinery.

Scars of Battle

As one travels across Normandy into Brittany and then on to Paris along the invasion route, the results of the war are of course everywhere apparent. For the most part, as is so often said, all shelled and bomb-wrecked French towns look alike. Valognes, Carentan, Isigny, Vire, Avranches, each exhibits the familiar gutted area of masonry buildings marked by piles of rubble and grotesquely shaped ruins of walls, but none seems any worse than the other. And then you come to St. Lo. Here is devastation beyond any possible preconceived idea. Here was a town of between 10,000 and 15,000 inhabitants that now is a pile of ruins as dead almost as though it were a Roman relic.

Located on both slopes of a deep narrow valley, St. Lo was churned to bits by opposing artillery occupying the surrounding heights, and it was bombed often and well. Like Stalingrad, Cassino, Warsaw and Budapest, however, it finally had to be cleared of the enemy by the foot soldiers and then opened up to tanks and other military traffic by the mine detectors, the bulldozers and the plain, ordinary hand shovels of the combat engineers. But little else can be done for St. Lo beyond opening roads through its wastes. It stands a true and terrifying monument to war's destructiveness, wreckage that no amount of engineering or construction skill can return to a habitable state short of building a completely new town.

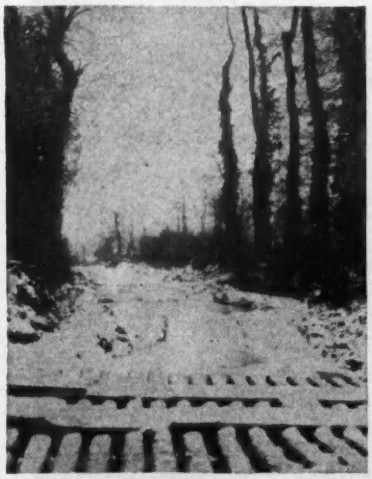
Transport facilities, too, bear scars of combat, visible principally in the

...tes that once closed this entrance to a basin in St. Malo harbor, permitting it to float ships even at low tide, were ...troyed by the Germans. This type of demolition, possible in nearly all harbors in France, is very effective.

...idges, both highway and railway, ...d in the main railroad yards where ...comotives, cars and track are still ...be seen in almost inextricable jum...s. Along the routes that consti...ted the "Red Ball" highway, over ...hich our great truck convoys trav...ed from Normandy to the front ...hile the railroads were being re...ired, there is evidence of much ...tching and some overlooked chuck ...les, but in general the French roads, ...e the British, seem to have resisted ...ilitary traffic very well.

And like the British roads, most of ...em have heavy stone foundations of ...elford type and well-bonded and ...mpacted tar macadam surfaces. In ...is connection it is significant to re...ll that the Frenchman, Tresaguet, ...enerally credited with having origin...ed the modern stone road as dis...nct from the ancient Roman roads, ...ntedated both Telford and Macadam, ...e British engineers whose names be...ame synonomous with this type of ...oad construction.

Highway bridges along the roads ...nd within the towns are going ...hrough an evolution that will even...ally restore them to their original ...ppearance, the almost invariable ob...ective of the French. After the Germans destroyed the bridges—collapsing a span or two or blowing the abutments—they were bypassed by the floating or trestle-supported treadway bridges of the combat engineers. Then, as the front moved ahead, the treadways were superceded by Bailey truss bridges erected over the wrecked spans, and then as time went on timber trestles, providing a wider roadway, replaced by Bailey bridges.



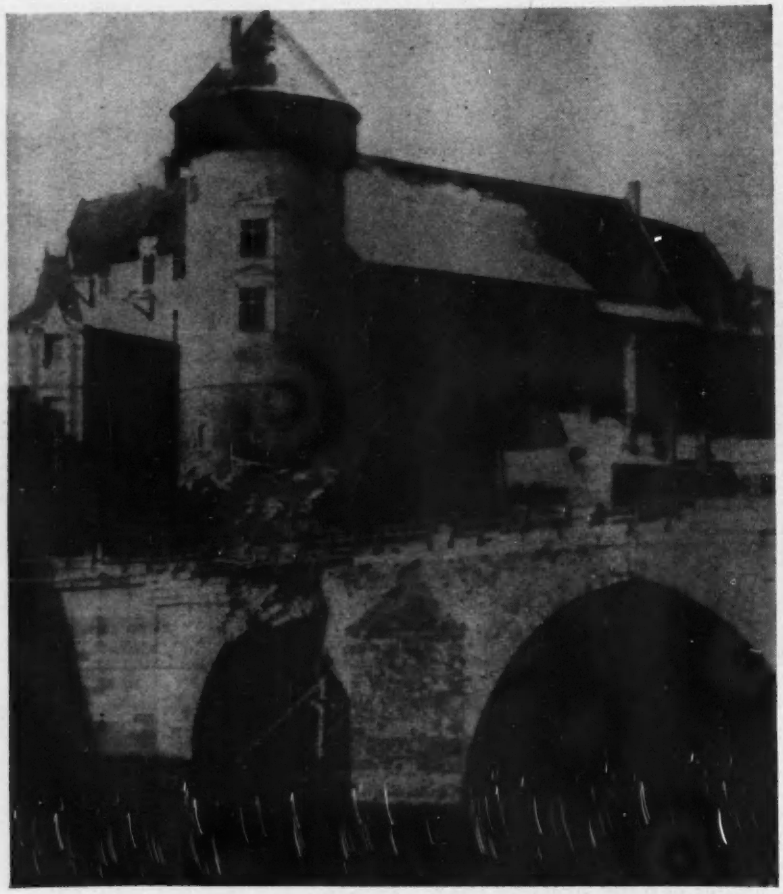
Plank road in depot passes over former dirt road, now a trench with 4 ft. of water and ice in it.

Now, in some places—and a surprising number it is—the French highway and bridge organization (*Service des Ponts et Chausseés*) is moving in to start construction on the permanent spans of masonry, concrete or steel, as they were in the beginning.

Railroad bridging a big job

More spectacular and difficult than the job of military highway bridging, however, was that of restoring the railway structures, and the work our Army Engineers have done with the Unit Construction Railroad Bridge (UCRB) and other standard military bridge items, as well as some captured from the Germans, is a story in itself to come later. That the transport section in Colonel Berrigan's Com. Z. construction department under Col. C. Haug and Lt. Col. Robert Radford as well as several special Engineer regiments who built the bridges had one of the most critical assignments of the war and completed it in record time is greatly to their credit.

Several of the more important of these highway and railway bridge jobs are in Brittany as are also a surprisingly large number of other im-



Vieux Chateau bridge, a 3-span structure at Laval, built about 800 years ago, had its two end spans blown by the Germans. I-beams carried at the center by a single timber bent braced against the foundation provided a simple and rapid means of temporary crossing. The chateau for which the bridge is named is in the background.

Laminated timber beams, built from scrap lumber by the French, make fine temporary bridge members as they are surprisingly strong. This highway structure is in Le Mans.

portant Engineer operations despite the distance of this area from the front. Through Engineer forestry units, and contracts with more than a hundred French sawmills, between one and two million board feet of lumber is being made available each month. Thousands of prisoners of war have been turned over to the Brittany Base Section and providing camps for them is a continuous job. Large quantities of German engineer equipment and supplies were captured in the Battle of France and most of this is being reconditioned for our use in the Brittany supply depots.

American and French cooperation

Then there is the job of removing our Bailey bridges now that the "Red Ball" highway traffic is not so heavy, and of aiding the French in getting their permanent or semi-permanent structures under way. And there was until recently a considerable program of railway bridge building. There is thus no lack of activity in Brittany although Col. C. H. Cunningham, the Base Section engineer, probably regrets that it relates only to this multiplicity of "housekeeping tasks" rather than to a major harbor job such as might have been required at Brest, Lorient, St. Nazaire or Nantes if the Germans had not been run out of France so quickly.

Colonel Cunningham will be remembered for his long-time interest in East coast beach erosion problems and harbor development and for his work in the New York Engineer District before the war. With respect to his present assignment he pays high tribute to the effectiveness of the French Ponts et Chaussees engineers who were already busy repairing bombed bridges and roads when we came in, and have done so much to aid us since.

All of our Engineer officers find these associations with the French engineers and contractors pleasant and satisfying, but one gathers that they do not particularly care for the granite hills and austere landscape of Brittany that is rendered weird by trees consisting only of a trunk bristling with twigs, somewhat resembling a porcupine standing upright. Such trees result from the Bretons' practice of continuous cutting for fuel of all branches when they attain a length of 4 or 5 ft., and thus become useful as faggots.

In this "faggot factory" as Colonel Cunningham has nicknamed the Brittany Base, one of the useful French contributions has been a laminated timber bridge girder. When considerable numbers of these girders were captured they were believed to be German, but later their origin was determined to be French. Made of scrap lumber, for there was no other kind available to the French during the German occupation, the girders nevertheless are surprisingly strong.

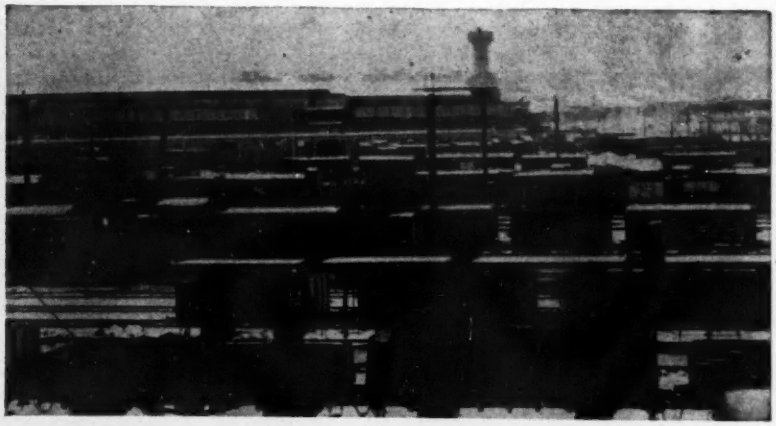
Not greatly different from some of the I-section timber girders developed for war construction in the United States, these French girders have a web of two thicknesses of boards set diagonally at about a 60 deg. inclination with the horizontal, one thickness sloping one way, the other opposite. The flanges consist of two or more boards on edge each side of the web and a board placed flat over the top as a cap plate, the whole assembled with hundreds of nails driven to an exact geometrical pattern.

For a railroad bridge of 24-ft. clear span, pairs of these girders 54 in. deep were used under each rail. The two-thickness web was of 1x8's and the flanges, each of four pieces on edge and one flat, were of 1½x8's. In addition 3x4-in. web stiffeners were spaced every 4 ft. 4 in. This bridge, to carry 90-ton locomotives, is the only one of its capacity constructed to date. There are several bridges built for lighter highway loading that utilize this type of girder.

The German "meter beam"

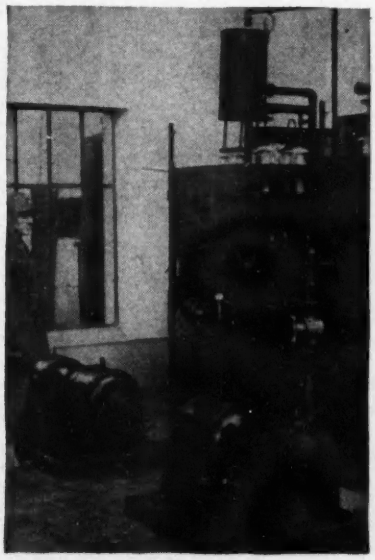
Among other captured German items, which also first came into our hands in Brittany, is the so-called "meter beam", a rolled girder approximately a meter, or 39 in. deep, weighing 213 lb. per ft., and of various lengths up to 90 ft. It is what the Germans use for bridging where we would utilize the Unit Construction railroad—or the Bailey highway trusses; they just install as many of the beams side by side as the maximum load requires, sway bracing and other details being attached by welding.

Although the meter beam has disadvantages as a military bridge item, its simplicity is very appealing, and we and the French are naturally using it in as many bridges as its supply will permit, as will be described in more detail in a future article.



Railroad yard, once a scene of desolation from our bombing, cleaned up and rebuilt, except for overhead catenaries, as this was an electrified area. Note concrete water tank in background. "Tower" consists of a thin reinforced concrete shell, with some horizontal bracing. Some of these towers are still standing with holes in them that account for half of the base cross section.

The route into Paris from Brittany is marked here and there by burned out trucks and tanks, but these and the temporary bridges in the towns, such as those shown in the accompanying illustrations, are the only evidence that war passed this way. And in Paris it is very easy to overlook about the only result of the war —chips taken out of the stones in the walls of a few public buildings by small-arms fire.

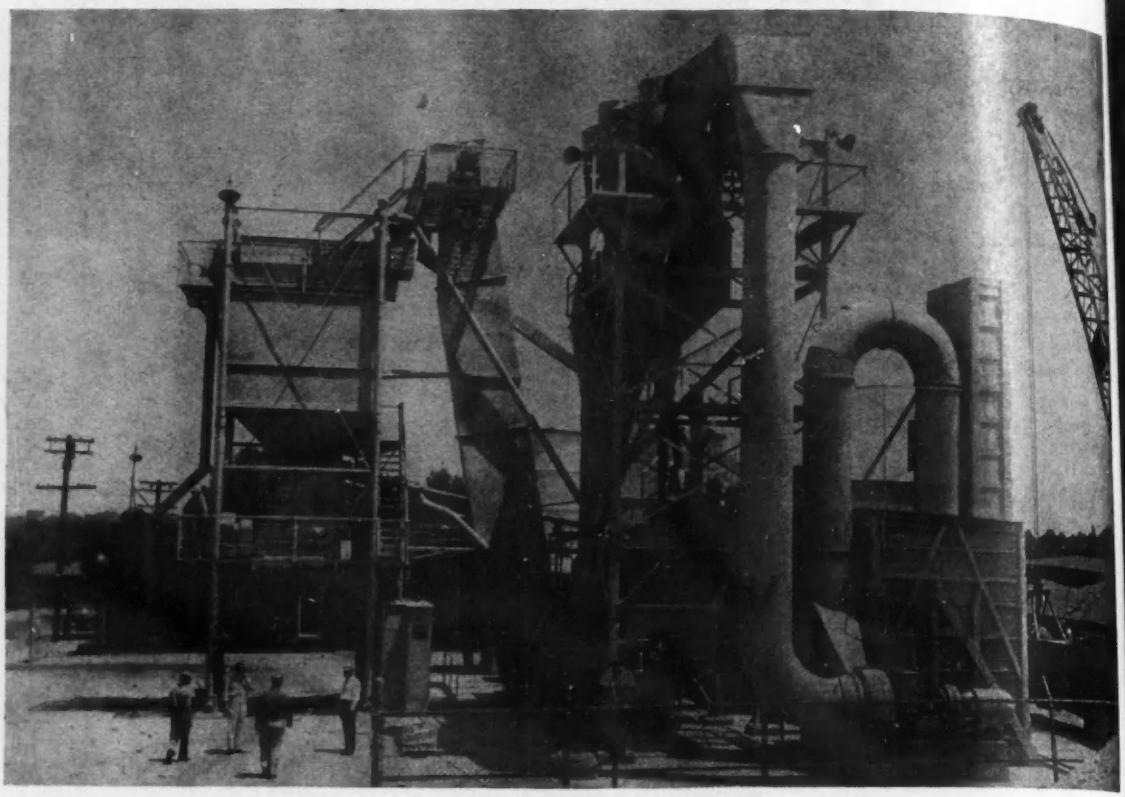


Many French cities use ozone treatment for their water, and have done so for years. This is the plant at Granville in Normandy. Ozone is generated by high-voltage discharge. In most cases we have supplemented the treatment by chlorine for our own troops' use, particularly to assure that some residual will be in the distribution mains.

That Paris escaped damage is a fact that all the world has noted with relief, and in which engineers particularly can take satisfaction. It was in Paris that our profession of engineering originated when in about 1750, the first engineering school, l'Ecole des Ponts et Chaussees, was established under the direction of the great French engineer, Jean Rodolphe Perronet. It is in Paris that Perronet's Pont de la Concorde still crosses the Seine in flat arches of 13-ft. rise and 102-ft. span and whose construction in 1791 marked the first application of engineering thought and principles to bridge design, and made the Roman-type arch bridges, which preceded it, look like stone walls with semicircular holes in them, which in fact they were.

Many other bridges of Paris, too, both younger and older than Perronet's masterpiece, as well as the city's public buildings, its great boulevard system and its monuments have both scientific and sentimental interest for engineers. It is a great piece of good fortune that none of them has been damaged.

Nor is it to be overlooked that Paris can logically be regarded as the birthplace of our own military Corps of Engineers. For it was modeled directly after the Corps of Engineers in the French Army, which was organized in 1672 on the urging of the French military engineer, Vauban.



St. Louis conducts a large wartime program of street maintenance using city-owned asphalt plants and hired labor.

Street Repair with City-Made Asphalt

***Contents in Brief**—Low-cost street repairment and maintenance are effected by the City of St. Louis through the efficient operation of city-owned asphalt plants. This large program includes asphaltic concrete construction, surface treatment with liquid asphalt and gravel, and cold-mix asphalt patching.*

SPURRED ON by a steadily increasing rate of pavement deterioration under wartime traffic the City of St. Louis is executing a street maintenance program of a magnitude never before attempted. This year's program calls for surface treating 2,200,000 sq. yd. of asphalt type streets and alleys, as compared with a yearly average of 1,250,000 sq. yd. during the past three years.

The successful completion of such an extensive program within one season is made possible by utilizing to the fullest the city's trained operating personnel under experienced supervision, and by using up-to-date, city-owned street maintenance equipment.

New street construction is not being emphasized at present due to scarcity of labor and the difficulty of obtaining necessary materials. At the proper time new construction will be resumed to provide maximum post-war employment. This work, according to a city ordinance, must be done by contract.

Three types of resurfacing

Hot-mix asphalt, manufactured in city-owned asphalt plants, is employed chiefly in street repairment, although a small amount of cold-mix asphalt is laid. Current work includes three types of resurfacing: (1) old brick and concrete pavements nearing complete failure but whose useful life can be extended some 10 years by resurfacing with a minimum of 1½-in. of asphaltic concrete; (2) existing asphaltic pavement, badly cracked but retaining a fairly smooth surface which can be put in first class condition, with at least three more years of service added, by surface treating with liquid asphalt and pea gravel; and (3) old macadam or bituminous pavement which needs occasional patching with a cold-mix asphalt.

St. Louis has some 1,100 mi. of streets of all types, many of which are subjected to heavy wartime traffic. The current large surface-rehabilitation program is considered necessary to prevent future maintenance from getting beyond control.

A sizeable portion of the program includes the rehabilitation of old brick and concrete pavements. These are first washed clean and permitted

ecome thoroughly dry. A prime of emulsified asphalt is applied nd at a rate of 1 gal. per 20 sq. f pavement, and all depressions filled with an asphaltic binder e. A minimum of 1½ in. of hot-sphaltic concrete then is applied hand-spread to a fairly smooth ur with a 42-in. light wooden ghtedge.

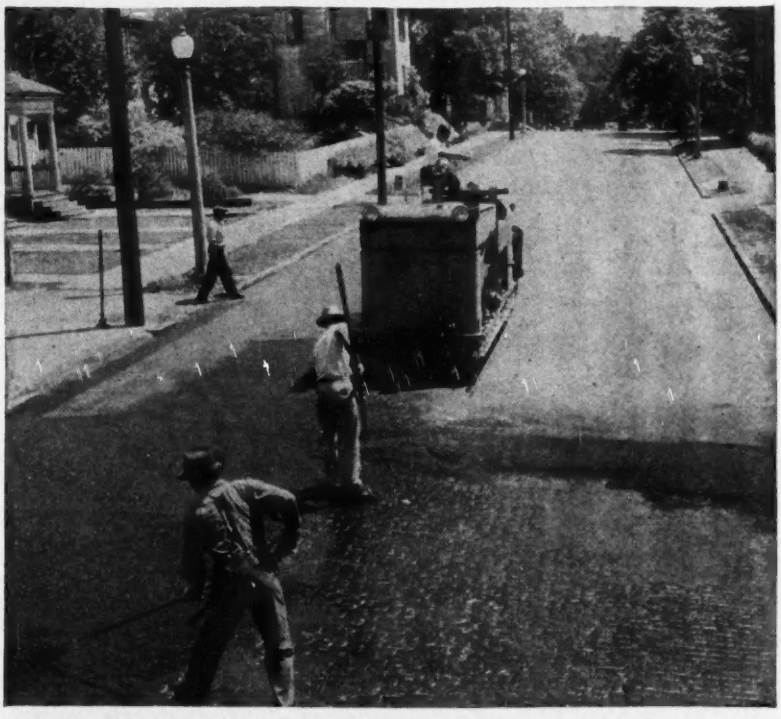
e new surfacing is well rolled a 10-ton tandem roller, with 6 lb. raded sand being added per sq. immediately after the first rolling, while the asphaltic paving is still Addition of the sand before final ng not only fills any voids which t occur in the asphalt but it im- a non-skid and non-glare sur- coating to the pavement.

ll gutter lines of newly laid as-lt are hand tamped to prevent the tration of surface water and to vent the upward percolation of any -surface water. Resurfaced streets opened to traffic immediately fol-ing final rolling. While it is gen-ly believed that a 24-hr. interim ween final rolling and resumption traffic would result in a slightly ter pavement, the density of traffic most cases will not permit such a ocedure.

A typical asphalt-laying gang em-ying one foreman, a roller operator d 10 laborers, lays about 125 tons asphalt in 8 hours. A larger ton-ge of mixture could be laid by each ng, but for the shortage of trucks r hauling. From twelve to fifteen ngs are employed on all three types surface repairment; three gangs ply cold-mix asphalt patches, while e remainder are about equally di-ded between laying new asphaltic ncrete and surface treating with quid asphalt and pea gravel. Asphalt mulsion is delivered to the job in -gal. drums, one of which usually vers a day's work. The asphaltic ncrete is trucked from the city's ant in 5-ton trucks. The average cost resurfacing streets and alleys with phaltic concrete is 60c. per sq. yd. me 42,500 tons of hot mix was rned out during the 1943 season.

Surface treatment only

In the repairment of streets, alleys d park drives, originally paved with phaltic concrete, brick or bitulithic ncrete, many of which are from 15 20 years old but now are badly racked and pitted, the following



Principal resurfacing methods include surface treatment with liquid asphalt and pea gravel (top) and an asphaltic-concrete mat.

method has proved very successful. Streets are flushed clean and permitted to become thoroughly dry, and all abnormally thick asphalt patches are removed flush with the old pavement. A coat of RC-3 liquid asphalt is applied under a pressure of 60 psi. and at a rate of ⅓ gal. per sq. yd. It is furnished and applied under contract. Both 150-200 penetration asphalt, and emulsified asphalt (Fed. Spec. 674—Type III) is used in this treatment and found equally successful.

This primer coat is followed immediately by applying 18 lb. of "Meramec" torpedo gravel per sq. yd., to which has been added 15 percent concrete sand passing a ¼-in. mesh screen. The gravel, which is graded to pass a ⅜-in. mesh screen, is secured from the Meramec River, about 20 mi. west of St. Louis and delivered under contract into a gravel spreader at the job. In some instances where cracks are small, sand alone is used, omitting the gravel. Rolling with a 10-ton tandem roller completes the job ready for traffic. This surface treatment is ap-

plied at a total cost of 7c. per sq. yd.

The Meramec torpedo gravel provides a wearing surface of uniform contour, yet highly resistant to skidding even in wet weather. In addition, its reddish-brown coloring imparts a non-glaring, attractive finish to the street surface.

In numerous instances, where the old pavement was badly cracked yet it does not warrant the application of an asphaltic concrete surface, it has been found necessary to apply a second treatment of liquid asphalt and gravel. In such cases, however, it has been found advantageous to let traffic roll the material in for one complete season before applying the second treatment.

Of primary importance in securing low-cost pavement, as well as a high-production of asphalt for St. Louis' large street rehabilitation program is the efficient operation of its relatively new asphalt plant. Built in 1940 at a cost of $135,000, the operation of this 125-ton per hour capacity plant seems worthy of note.

Materials for the asphaltic concrete are delivered under contract by railroad car onto a city-owned, ¼-mi. long double track siding. Binder stone passing a 1-in. mesh sieve is secured locally, as are the ¼-in. limestone screenings. Sand comes from the Missouri River, and lead mine chats are secured from the lead belt of Missouri, some 100 mi. from St. Louis. Paving asphalt is obtained from Wood River, Ill.

Limestone is quarried in an open pit and elevated to ground level (top), then carried by conveyor to crushers and storage bins of the cold-mix plant.

Mineral aggregates are unloaded and stockpiled at the plant by a 1½ cu. yd. railroad crane. About 1,000 carloads are processed per year. The asphalt arrives in tank cars and is warmed sufficiently for unloading by a heating system in connection with the plant.

From the storage piles all mineral aggregates are hoisted by railroad crane into a 400-ton capacity steel storage bin, divided into four compartments to accommodate the various sized materials needed in the mixtures. Automatic feeders on the storage bin feed into a cold-material elevator leading to a drier that is heated by natural gas. A steady temperature of 330 deg. F. gives ample heat for drying the aggregates.

The asphalt plant is equipped with a dust collector that passes virtually all of the dust back through the hot-materials elevator, through a shaker screen and into the asphaltic mixture being manufactured. To eliminate the dust "nuisance," prevalent at many asphalt plants, a device for washing surplus dust was devised by the plant mechanics, which permits very little dust to escape into the surrounding air.

Job-made dust-washer

The dust-washer includes a large wooden box, 15 ft. square and 15 ft. high into which the excess dust is blown; from here it passes through a series of water jets into two concrete settling tanks. Each tank has a baffle wall which settles the saturated dust while the wash water flows into a city sewer. About four tons of rock dust, passing a 200-mesh screen, are removed each week from the settling tanks.

In mixing the asphalt, mineral aggregates are batched from the four compartments in the storage bin, carried up the cold-aggregates elevator and dumped into the drier. From there it passes up the hot-materials elevator into a bin of 42-ton capacity, or 8-truck loads of final product.

Asphalt in the tank cars is heated by a steam boiler sufficiently for pumping it into four storage tanks having a 60,000-gal. total capacity. The largest storage tank, whose capacity is 17,000 gal., is electrically heated. The other three are heated by steam. Liquid asphalt from the three smaller tanks flows by gravity into the 17,000-gal. tank where it is

Attractive non-skid surfaces are applied to badly cracked residential street pavements at relatively low cost, using surface treatment alone.

brought to the correct temperature before being pumped to the mixer.

Electricity, obtained from the city's line, is the chief source of power throughout the plant. Electric pumps unload the tank cars and pump the heated asphalt to the mixer. Final mixing of mineral aggregates and liquid asphalt, carefully batched by weight, is done in a 5,000-lb. capacity pug mill mixer. A compressed air ram unloads the asphaltic concrete from the mixer into trucks.

The plant's gas bill for drying the aggregates and heating the steam boilers averages $750 per month. Production costs, including all materials and labor, for this city-owned plant average $4.00 per ton of asphaltic concrete dumped into the trucks for transportation to the job.

Cleaning of the plant equipment is done with compressed air while the operating ground area is swept and flushed clean with water. The operating personnel includes a foreman, a crane operator and one helper, a stationary engineer, an electrician and three plant operators.

Cold-mix plant

All cold-mix asphalt used in the maintenance of St. Louis' streets and alleys is manufactured in a second city-owned plant, built in 1937, and located adjacent to a large open rock quarry owned by the city. About 15,000 tons of asphalt are manufactured annually in this plant, using emulsified asphalt and crushed limestone produced in the quarry by inmates of the city's house of correction.

All quarried rock is raised to ground level from the bottom of the 2,000-ft. long by 800-ft. wide by 200-ft. deep quarry by vertical steel-bucket conveyors operating in two lifts. From ground level it is transported over a railroad track to two large crushers by a 42-in. wide by 400-ft. endless belt conveyor. After crushing, the aggregate passes over various screens where it is separated into six sizes—4 in., 1½ in., 1 in., ½ in., ¼ in., and rock dust—all of which then goes into large storage bins.

From the storage bins, the limestone aggregates are batched and hauled by truck to the mixer, located nearby. Emulsified asphalt is delivered by tank cars from a railroad unloading spur into storage tanks at the plant. Cold-mix asphalt produced in this plant is used chiefly for patching old Telford type pavements too badly pitted to warrant surface treatment with liquid asphalt and gravel, and not sufficiently deteriorated to demand resurfacing with asphaltic concrete.

Both of the city's asphalt plants, as well as other divisions of the Department of Streets and Sewers, is under the supervision of Arthur C. Meyers, director; Henry W. Dawson, street commissioner; and Ernest H. Paffrath, sewer commissioner.

Swedish Engineers Build 60-mi. Aerial Tramway

A 60-mile aerial tramway is being built in Sweden from the railroad terminal at Boliden to Yiiterberg to bring down iron ore from the Kristineberg mining district. The spans average 660 ft., according to the *Railway Gazette* of London. Heretofore, large motor trucks mounted on 16 wheels were used, but it has become very difficult to replace worn tires.

An extension of the railroad was proposed, but the difficult and mountainous character of the country and the shortage of materials and equipment led to the adoption of the cableway as an alternative. The capacity is to be two tons per hour. There will be eight driving stations, each operated by a motor of 135 hp. A 37-mile branch will serve the copper mines at Adok, and another branch of 25 miles will serve the Lainjour nickel mines.

Calculation of earth pressures on retaining walls like these is simplified by a new adaptation of the Rankine formula.

Earth Pressures in Retaining Wall Design

Conrad H. Lang
Senior Grade Separation Engineer
New York State Department of Public Works
Albany, N. Y.

***Contents in Brief**—Adaptation of the Rankine formulas for earth pressures may be used for the simplification of retaining wall design. An illustrative example shows the application of this newly developed procedure to a conventional abutment retaining wall traversing a sloping bank of earth at an oblique angle and with the backfill having a broken slope.*

THE THEORIES of Coulomb and Rankine have been used for many years as the bases for evaluating earth pressures to be used in the design of retaining walls. Recent developments in the field of soil mechanics have shown us that while many of our former concepts relative to the action of soils require change or drastic revision to make them compatible with the facts, the so-called classical theories of earth pressure remain eminently satisfactory for the role assigned them in design work.

The writer is aware of the fact that these two theories are not in exact agreement, and that of the two, as Professor Terzaghi so ably demonstrates in his *Theoretical Soil Mechanics* (John Wiley and Sons, N. Y., 1943), the Coulomb theory most nearly approaches actual conditions. It is not the purpose of the writer to point out the differences which exist between these two theories as compared with each other, or between either of them as compared with actualities. It is sufficient here to make the general statement that, for practical purposes, either theory may be used as a basis for evaluating pressures to be used in the design of walls.

Wingwall used as example

The New York State Department of Public Works uses in the design of its bridges the *Standard Specifications for Highway Bridges* of the American Association of State Highway Officials. Accordingly, as these specifications require the use of the Rankine theory, the methods contained herein are founded upon the equations derived by Professor Rankine many years ago. It is the purpose of the writer to show how these general formulas may be adapted for use in the design of walls retaining backfills with broken slopes and walls traversing sloping banks of earth at oblique angles. A typical example embracing both of these problems would be that of a conventional abutment wingwall.

In the diagram, the vertical plane W-W through the heel of an abutment Wingwall crosses the sloping bank of earth at the oblique angle α. The wall section to be investigated is represented by the plane S-S normal to W-W. The directions of the horizontal pressures p_1, p_2 and p_3 are as shown.

If the surface slope were considered as infinite in extent the pressure p_1 given by the well known Rankine formula (1) would be

$$p_1 = wx\left[\cos^2\theta\,\frac{\cos\theta-\sqrt{\cos^2\theta-\cos^2\phi}}{\cos\theta+\sqrt{\cos^2\theta-\cos^2\phi}}\right]$$

and the conjugate pressure p_2 would be given by the formula (2)

$$p_2 = wx\left[\frac{\cos\theta\,(1-\sin\phi)}{\cos\theta+\sqrt{\cos^2\theta-\cos^2\phi}}\right]$$

Since in practice infinite slopes are never encountered, it is obvious that

ne adjustment must be made to se equations in order to adapt m to practical usage. An inspec- n of the equations will show that adjustment can only be made in quantity θ, since the terms w and are constant throughout the mate- l and x can be chosen at will.

Referring to the diagram, let us ume that the surface of the bank, tead of leveling off as shown, con- ues upward as indicated by the shed line to the point Z, the inter- tion with the line B Z. For this ight of embankment M/H has a lue of 7.0 and the intensities of essure p_1, p_2 and p_3 have their maxi- m values. From Z to the right, the rface of the bank may slope in any rection consistent with ϕ without fecting the pressures on T B. Ac- rdingly, for any value of M/H equal or greater than 7.0, θ has its full lue, here chosen at 29 deg. 46 min.

The reason for this is obvious. The ass of earth to the right of the lane B Z is stable within itself. herefore the only remaining mate- ial contributing directly to pres- ures on T B is the triangle of earth B Z.

Let us now assume that the bank evels off as shown in the diagram at e height indicated by the dimen- ion M. The mass of earth to the ight of B L is again stable within self and the only material con- ributing directly to pressures on T B that represented by the trapezium B L K. It is evident by inspection hat the pressure p_1 at point B should e less in this case than when the urcharge extended to point Z or be- ond.

New surcharge slope substituted

Since the pressures given by the Rankine theory are obtained from he principles of conjugate pressures, t is necessary, in the case of a roken surcharge slope such as is ere represented, to resolve the area of the trapezium T B L K into a rapezoid of equal area but having he top surface bounded by one ather than two different lines. This may be done by making the area of he triangle T N K equal to the area of triangle N L O. The area of T B L K will then equal the area of the trapezoid T B L O and, if the thickness of the slice is considered to be unity, the total weight of the solids thus formed will be identical.

DEFINITIONS OF SYMBOLS

- p_1 — unit horizontal pressure in a direction parallel to the vertical plane containing the steepest surface slope and acting on a vertical plane normal to the direction of thrust.
- p_2 — unit horizontal pressure conjugate to p_1.
- p_3 — unit horizontal resultant pressure of p_1 and p_2.
- w — unit weight of earth.
- x — depth below the ground surface.
- θ — angle of surcharge.
- θ_1 — adjusted angle of surcharge.
- ϕ — angle of repose or angle of friction. (Assumed to be identical for cohesionless material.)
- α — horizontal angle between the vertical plane normal to p_2 and the vertical plane normal to p_3.
- M — height of embankment.
- H — height of wall.
- d — 1/10 H.

The new figure, T B L O, having a new surcharge slope of θ_1 will, it is evident, exert a constant unit vertical pressure on the conjugate plane B R, hence equations (1) and (2) can be used, substituting θ_1 for θ in order to evaluate p_1 and p_2 at the point B. In a similar manner, intensities of pressure may be found for any depth x between points T and B.

With the intensities p_1 and p_2 known at various points in the height H the intensities of pressure p_3 may be evaluated. In formula (1) let the portion within the brackets be designated by the letter A, and in formula (2) let the portion within the brackets be designated by the letter B. Then

$$p_3 = w\,x\,C \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (3)$$

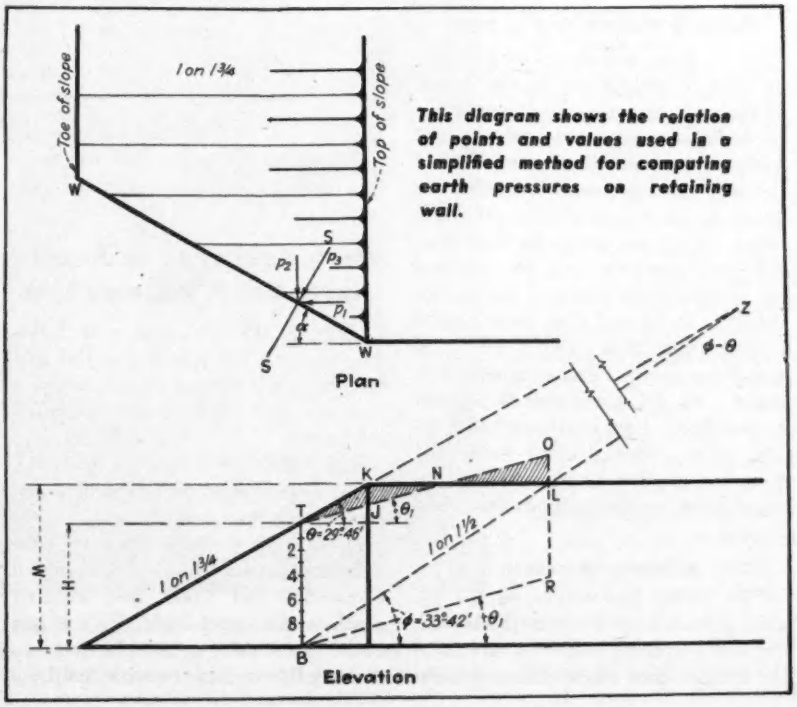
where

$$C = \sqrt{A^2 \sin^2\alpha + B^2 \cos^2\alpha} \quad \ldots\ldots\ldots \quad (4)$$

Table Speeds Computations

In the accompanying table, values of θ_1, A and B have been computed for each of ten points in the height of a vertical plane for various values of M/H and for values of θ=29 deg. 46 min. and ϕ = 33 deg. 42 min. Since the values of A and B in the table are always the same for a given ratio of M/H, they can be used regardless of the actual height of wall and embankment. In order, however, to determine the various intensities of pressure p_1, p_2 and p_3 in the height of a particular wall, equations (1), (2) and (3) must be multiplied by the ratio d, where d is equal to one-tenth of the actual height H under consideration.

To illustrate the use of the table assume that, in the diagram, M = 28 ft., H = 20 ft., a = 30 deg. and w = 100 lbs. Then M/H = 1.4, and d = 2.0. From the table the values of A and B for M/H = 1.4 are obtained for each of the points 1 through B. A value for C at each



This diagram shows the relation of points and values used in a simplified method for computing earth pressures on retaining wall.

of the same points is figured from equation (4) as follows:

C(point 1) = $\sqrt{(.417 \times .50)^2 + (.345 \times .866)^2} = .364$

C (point 2) = $\sqrt{.397 \times .50)^2 + (.337 \times .866)^2} = .354$

C (point 3) = $\sqrt{.375 \times .50)^2 + (.328 \times .866)^2} = .341$

C (point 4) = $\sqrt{(.357 \times .50)^2 + (.320 \times .866)^2} = .330$

C (point 5) = $\sqrt{(.345 \times .50)^2 + (.315 \times .866)^2} = .324$

C (point 6) = $\sqrt{(.335 \times .50)^2 + (.310 \times .866)^2} = .316$

C (point 7) = $\sqrt{(.328 \times .50)^2 + (.306 \times .866)^2} = .312$

C (point 8) = $\sqrt{(.322 \times .50)^2 + (.303 \times .866)^2} = .308$

C (point 9) = $\sqrt{(.316 \times .50)^2 + (.301 \times .866)^2} = .305$

C (point) B = $\sqrt{(.313 \times .50) + (.300 \times .866)^2} = .304$

and values for p_3 figured from equation (3) as follows:

p_3 (point 1) = $100 \times 1 \times .364 \times 2.0 = 73$ lb. per sq. ft

p_3 (point 2) = $100 \times 2 \times .354 \times 2.0 = 142$ "

p_3 (point 3) = $100 \times 3 \times .341 \times 2.0 = 205$ "

p_3 (point 4) = $100 \times 4 \times .330 \times 2.0 = 264$ "

p_3 (point 5) = $100 \times 5 \times .324 \times 2.0 = 324$ "

p_3 (point 6) = $100 \times 6 \times .316 \times 2.0 = 379$ "

p_3 (point 7) = $100 \times 7 \times .312 \times 2.0 = 437$ "

p_3 (point 8) = $100 \times 8 \times .308 \times 2.0 = 493$ "

p_3 (point 9) = $100 \times 9 \times .305 \times 2.0 = 549$ "

p_3 (point B) = $100 \times 10 \times .304 \times 2.0 = 608$ "

The last term, 2.0, in each case being the ratio d.

Pressure diagram readily found

From these intensities of pressure at each of ten points in the height of the wall, the pressure diagram can be readily constructed and the stability of the wall investigated. Should the wall section under investigation prove to have some value of M/H other than those listed in the table, sufficient accuracy can be obtained by interpolating between the values listed. It should be remembered however that these values of θ_1, A and B are only for embankments having a 1 on 1¾ surcharge slope with an assumed slope of repose of 1 on 1½. For other desired values of θ and ϕ similar tables can be prepared based on the methods described herein.

Accuracy of results

The writer has compared the results obtained by these methods with various graphical solutions and is of the opinion that where differences exist they will be less than ten percent. For practical purposes, differences of this order of magnitude are insignificant if the basic assumptions of the theory are fully understood and recognized elsewhere in the finished design.

VALUES OF θ_1, A AND B FOR VARIOUS VALUES OF $\frac{M}{H}$ WHEN $\theta = 29°\ 46'$ AND $\phi = 33°\ 42'$

M/H	Point	θ_1	A	B	M/H	Point	θ_1	A	B
7.0	All	29°-46′	.420	.347	1.6	1	29°-46′	.420	.347
						2	29°-20′	.411	.343
6.0	1-9	29°-46′	.420	.347		3	28°-30′	.397	.337
	B	29°-44′	.418	.346		4	27°-28′	.381	.331
						5	26°-23′	.368	.324
5.0	1-6	29°-46′	.420	.347		6	25°-16′	.357	.320
	7-8	29°-44′	.418	.346		7	24°-14′	.349	.316
	9	29°-41′	.417	.345		8	23°-10′	.341	.312
	B	29°-39′	.416	.345		9	22°-15′	.335	.310
						B	21°-21′	.329	.307
4.0	1-5	29°-46′	.420	.347					
	6	29°-44′	.418	.346					
	7	29°-41′	.417	.345	1.4	1	29°-41′	.417	.345
	8	29°-36′	.416	.345		2	28°-30′	.397	.337
	9	29°-28′	.414	.344		3	26°-56′	.375	.328
	B	29°-20′	.411	.343		4	25°-16′	.357	.320
						5	23°-42′	.345	.315
3.0	1-3	29°-46′	.420	.347		6	22°-15′	.335	.310
	4	29°-44′	.418	.346		7	20°-54′	.328	.306
	5	29°-38′	.416	.345		8	19°-42′	.322	.303
	6	29°-28′	.414	.344		9	18°-34′	.316	.301
	7	29°-18′	.410	.342		B	17°-35′	.313	.300
	8	29°-02′	.406	.341					
	9	28°-40′	.401	.339					
	B	28°-30′	.397	.337	1.2	1	28°-30′	.397	.337
						2	25°-16′	.357	.320
2.0	1	29°-46′	.420	.347		3	22°-15′	.335	.310
	2	29°-44′	.418	.346		4	19°-42′	.322	.303
	3	29°-28′	.414	.344		5	17°-35′	.313	.300
	4	29°-02′	.406	.341		6	15°-54′	.306	.296
	5	28°-30′	.397	.337		7	14°-28′	.303	.294
	6	27°-56′	.390	.334		8	13°-13′	.300	.293
	7	27°-18′	.381	.330		9	12°-14′	.297	.292
	8	26°-37′	.372	.326		B	11°-22′	.296	.291
	9	25°-55′	.364	.323					
	B	25°-16′	.357	.320	1.1	1	25°-16′	.357	.320
						2	19°-42′	.322	.303
1.8	1	29°-46′	.420	.347		3	15°-54′	.306	.296
	2	29°-38′	.416	.345		4	13°-13′	.300	.293
	3	29°-10′	.409	.342		5	11°-22′	.296	.291
	4	28°-30′	.397	.337		6	9°-52′	.294	.290
	5	27°-45′	.386	.332		7	8°-45′	.291	.289
	6	26°-56′	.375	.328		8	7°-55′	.290	.289
	7	26°-12′	.366	.324		9	7°-08′	.289	.288
	8	25°-16′	.357	.320		B	6°-34′	.289	.288
	9	24°-31′	.351	.317					
	B	23°-42′	.345	.315	1.0	ALL	0	.286	.286

Work Advanced on Brazil's North-South Railway Link

The $33,000,000, four-year 1944-47, program for completing the first longitudinal railway link between northern and southern Brazil is well advanced.

The Office of Inter-American Affairs, Department of Transportation, reports that there are currently 10,000 men working northward on the 338-mile gap between Montes Claros and Contendas and 3,000 men working southward to meet them. This is one of the two missing gaps to be closed to connect Rio de Janeiro with Natal.

The Central do Brasil Railway, which is in charge of construction on the 149-mile stretch between Montes Claros and Monte Azul, already has trains in operation 38 miles north of Montes Claros to Burarama and has announced early inauguration of service on the 45-mile section north of Burarama to the Janauba Station.

The National Railway Department, which is in charge of rail construction on the 187-mile section between Contendas and Monte Azul, has trains in operation 20 miles south of Contendas to Umburana, and expects to establish service soon eight miles further south to the Brumado Station.

Some suggestions on—

Adding Years of Service to Equipment

Russell Ralph
Kaw Paving Co., Topeka, Kansas

Contents in Brief—This is a report by a man whose company has made a planned study of how to use its equipment for current work, yet preserve the machines for postwar construction when equipment may be hard to get. A mobile maintenance outfit, with special crew, is sent to each job with the equipment. Operators of machines are made personally responsible for inspection and continued proper maintenance of the equipment.

FREQUENT INSPECTION coupled with immediate repair and complete on-the-job servicing has made it possible for the Kaw Paving Co. to keep equipment in good operating condition that under usual conditions would have been entirely worn out. This careful maintenance program will pay added dividends in providing a pool of serviceable equipment for postwar work since it is doubtful that new machines and equipment will be quickly available when the war is over. Although some manufacturers may now be able to produce as much equipment in two or three months as they did in a year before the war, it is the opinion of the writer that contractors should plan on at least a year after the end of the war in Europe before restrictions are lifted and new machines are readily available.

Acting on this premise, the Kaw Paving Co. has placed special emphasis on equipment care. The first step in such a program is to make each operator personally responsible for the inspection of his machine. Every effort is made to locate defective parts and practices and to correct them before break-downs have an opportunity to occur. Operators are required to engage in ten times as much inspection as they did five years ago. And it is regular practice for the operator to check his equipment in the morning, at noon and at night, as well as at every lay-up for any cause.

It seems certain that time spent on such checking is not more than a small part of one percent of the time that would be lost on equipment actually stopped for repairs. Before the stepped-up inspection program was inaugurated, machines averaged about twice as many hours lost per break-down as they now do.

In many instances where a machine breaks down the dollar and cents cost of repairs might not be large, but this machine may be a key unit that halts use of other equipment, thus causing a large man and machine-hour delay on a project.

The primary rule of the Kaw organization is: "When in doubt make another inspection. No operator ever reported a breakdown caused by too many inspections, or by knowing too much about the condition of a machine.

Inspections and on-the-job servicing have been increased to a point where the work can well be considered preventative maintenance. For operation with each field organization of machines, even on relatively small jobs, a complete machine and repair shop is provided. These units carry sufficient tools, equipment and those parts frequently needed to make emergency repairs or replacements. Field activities, however, are largely a matter of regular inspection, minor adjustment and correction to prevent major breakdowns.

Each repair unit has a complete welding outfit. In addition to repair welding operations, gear teeth, shafts, sheave grooves and drum surfaces are built up with rods of the proper

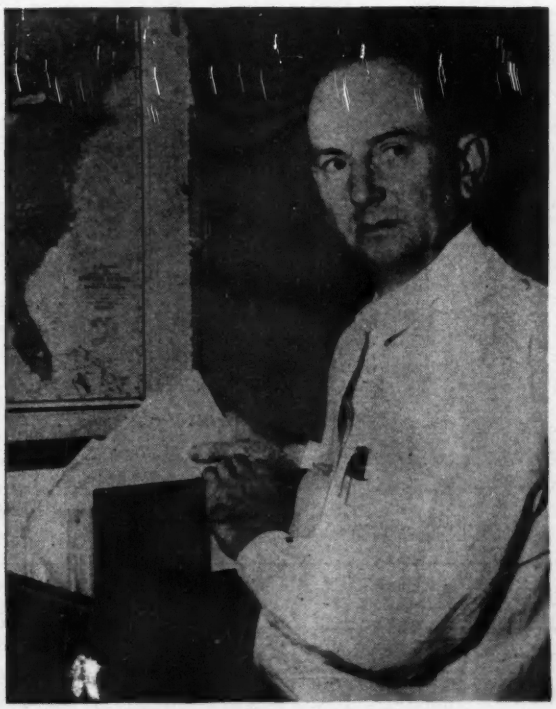


Fig. 1. Russell Ralph, the author, keeps a record of each machine and each piece of wire rope from purchase to final disposition as part of his program of planned maintenance to assure greater life from equipment.

Fig. 2. Each Kaw Paving Co. unit in the field is accompanied by a mobile repair unit, which includes a complete welding outfit, useful for building up worn parts as well as making actual repairs.

Fig. 3. A home made "candler" for wire rope with an eight-power magnifying glass and two 110 volt lights (inside) is used for inspection of wire rope. Rope is thoroughly cleaned, then manipulated to open up strands as it passes under the lens. Inset shows the inside of the candler.

hardness. Frequently large parts are rebuilt in a tenth of the time required to get and install replacements.

The mobile repair units usually are manned by a head mechanic and three helpers. Where repair demands are heavy, additional welders and helpers are added to the crew. If the work requires the lay-up of a machine, the operators and helpers on the machine assist with the repair.

Conservation of wire rope

Experience with wire rope illustrates the benefits of inspection and proper maintenance. Actual records show that cables now give twice to three times the service formerly obtained from them. In prewar days when a cable showed wear it was discarded. The present practices of changing ends, cutting back and adapting to other uses were seldom thought of; in fact, there was no regular schedule of inspection for wire rope.

Today, each cable on our machines is listed in a permanent record and a chart is kept on the rope until it finally is discarded. Each time the rope is cleaned, inspected and treated with a new dressing, a note is made and posted to the record for that particular unit. Inspections have shown faulty alignment that, if not corrected, would have resulted in a costly lay-up for the machine. In many cases a rope beginning to show wear has been turned end for end, placing the weaker end on the drum where there is less stress, thereby practically doubling the life of the cable.

Protected storage

When wire rope is removed from a machine, yet part of it is good enough for further service on another machine, the rope is cleaned, carefully inspected and given a protective dressing before being stored. All wire rope, new and used, is stored in a closed-off section of a warehouse where there is no chance for water to leak onto the stored reels or for acid or other deteriorating materials to come in contact with the material. Recommendations of the rope manufacturer are used for dressings, and have been found to give excellent results.

For machine work the preformed type of wire rope is used as it has longer life and better operating characteristics. One of the advantages of the preformed wire rope is that

oken wires do not protrude to tear nds and clothing. This asset, how- r, makes it difficult to detect oken wires. The Kaw Co. has de- loped a "candler" (Fig. 3) under ich the rope is magnified so it is uch easier to detect broken wires. There is perhaps no part of a ma- ine that responds to care, adjust- ent and maintenance as does wire pe. Certainly there is no construc- on material where improved care ows results more quickly.

Helps for a new man

In training a new operator—and very construction organization has had a great deal of that to do in the last three years—the first step is to have the new employee go through the routine of inspection with an experienced operator. When the repair crew works on the machine, the new man is assigned to the work. He is instructed to watch every move and ask questions about things he does not understand.

It is the policy of the Kaw organization to make every man on the job responsible for the care of whatever equipment he handles. If a workman has a good suggestion for better maintenance and care, he is encouraged to report it. Bulletins distributed to employees stress the need for care and emphasize that the machines must be made to last for the duration of the war and longer.

Fig. 4. Operator interest and regular inspection prevent abuse, such as this, of wire rope. A machine on rental was returned with the rope in this very undesirable condition.

Employees are encouraged to read regularly some good trade magazine and it is the policy of the firm to enter subscriptions for all those who show a serious interest. Articles of special interest are marked in magazines and the foremen are asked to come into the office to read them. If a foreman wishes to have copies made for distribution to interested men this is done. This method has been found to be much more effective than merely broadcasting general information because it makes the foremen personally responsible for seeing that the men get and read the information of particular value to their work.

After the war—what?

Maintenance has its psychological element, just as safety does. Once a program is underway it carries along "under its own steam." There is nothing that is more susceptible to suggestion and constructive criticism than maintenance practices. Once an operator is convinced that through his own effort and care his machine will last longer and deliver more work, the idea will spread to other operators.

Owners and managers, too, have become maintenance-minded. They have been forced to give attention to the smallest detail, as inability to buy replacement parts might result in taking the machine, perhaps even the firm, out of construction work. This interest, through necessity, has been carried down to the superintendent, foremen, operators and workers. Everyone in the Kaw organization is agreed that frequent inspections and checks on equipment and on-the-job preventative maintenance is resulting in greater output in less time and at less expense per job—and with more satisfaction to the individual.

Michigan Town Considering Central Heating Plan for Entire Community

The city council of Escanaba, Mich., is considering a plan which, if adopted, will make the community the second city in the nation to heat all of its home, stores, schools and churches from one central heating plant (*ENR* Dec. 28, 1944, vol. p. 849). The city of 15,000 already has made a start in this direction, constructing a small central heating plant in 1937 to serve a limited number of customers in the downtown area, according to the International City Managers Association.

Local interest in the municipal service led the city council recently to ask for a survey and recommendations by the city manager with regard to expansion of the central heating system to include the entire community. This survey showed that community-wide heating by the central unit was feasible from economic and engineering standpoints.

To supply the entire system with heat would require a capital outlay of $3,190,000. About a third of this would be for plant and two thirds for the distribution mains.

Annual costs for the enlarged system are estimated at $240,000, compared to present expenditures of about $305,000 by individuals and private concerns for coal. Annual revenue from steam at 78 cents per 1,000 lb. and sale of electricity generated by the steam turbines would total $531,000, but the net profit would be small because annual capital costs would total more than $240,000.

Most unfavorable factor in carrying out the plan is the high initial cost of the underground system plus the cost of converting individual heating equipment to steam heating which would range from $200 to $500 per dwelling unit.

Recommendations to the city council were that the present plant be extended up to a capacity of 50,000 lb. of steam per hr. on a pay-as-you-go basis sufficient to serve the downtown area; that plans be made and an assessment and financial policy be established to enable the city to expand the plant as rapidly as economic conditions make subsidies available, and that no expansion be made beyond the downtown area unless at least 80 percent of the consumers in the area to be served agree to purchase heat from the central system.

From Field and Office

WORKING PROBLEMS AND TIME-SAVING METHODS FOR ENGINEERS AND CONTRACTORS

Demountable Wheels for 18-Ton Generators

An ingenious method for lifting and transporting 18-ton diesel-electric generating units has been devised by U. S. naval construction battalions to conserve the time of heavy cranes that formerly were required for this work. The moves are now made with the aid of two axles and automobile wheels for each, plus a jack that can lift one end of the unit at a time—a simple operation that can easily be performed by two men.

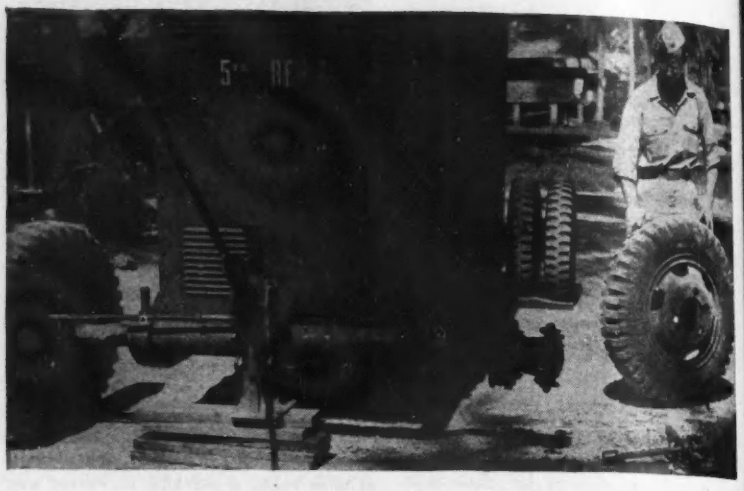
The diesel-electric units, which generate 75 kw. each, are a standard, primary source of power for naval construction forces and are usually mounted in banks to supply an entire camp. They are also moved as individual units for widely separated sources of power supply. They are very extensively used in the South Pacific where one base had 110 of them in service simultaneously.

At first it was customary to send out a heavy-duty crane to pick up these units for transfer to a new location. Cranes are scarce and are much needed for work that is carried on over a 24-hr schedule. The Seabees set about to devise some better plan.

It was noted that the supporting steel frame under these units includes a 4-in. transverse pipe at front and rear ends. Taking advantage of this convenient feature, an axle was designed which could be slipped through this pipe and then fitted with wheels on the projecting ends, single wheels on the forward, light end and dual wheels behind. A feature of the connection between wheel and axle is the eccentric bearing or off-set which compensates for irregularities in the road surface and, without the need for springs, takes up a good deal of the shock due to surface irregularities.

With this arrangement it is possible for the front end of the generating unit to be jacked up, the axle inserted and wheels fitted to both ends in a few minutes. Thus, two men can equip the unit with its new running gear and tow it away with a jeep.

The idea of springless wheels is not new as certain commercial vehicles have something similar, but its ingenious adaptation to an emergency by the Seabees is typical of their plan of improvising and "making do" with what they have.



Axles are thrust through the transverse 4-in. pipes at front and rear and then the wheels are put on, providing mobility for an 18-ton unit.

"Reefer" Depots Free Ships

In the humid tropics, where refrigeration is required for the food to which American forces are accustomed, particularly meat, eggs and fresh vegetables, refrigerated warehouses (or "reefer" depots) are used so that perishable foods can be unloaded immediately from refrigerated freighters, making it unnecessary for the steamers to stay long. Near the front this reduces the "sitting duck" risk and saves valuable ship time.

Typical units, like that shown in the accompanying picture, have 6,800 cu. ft. of refrigerated storage space made up of ten 675-cu. ft. units. Such a warehouse is shipped from the states in knocked-down form and can be speedily set up. These units are usually powered by two 75-kw. diesel-electric generators. On peak loads both generators can be used, though much of the time one is held in reserve as a spare.

Typical of the warehouse units in which refrigerator freighters leave their cargoes.

MORE AIR FASTER!

WHEN YOU USE SCHRAMM AIR COMPRESSORS

So you've another tough construction job that calls for an air compressor able to furnish a steady flow of air in great quantities?

This feature you specify—it's provided in all Schramm Air Compressors, portable and stationary. Note, for instance, in the illustrated action picture, how easily Schramm is doing the job—and furnishing all the air needed!

Schramm Compressors are lightweight—compact—sturdy units, able to stand rugged and constant use. If you are not already using a Schramm Compressor, it will pay you to write for details at once.

SCHRAMM INC.

THE COMPRESSOR PEOPLE
WEST CHESTER
PENNSYLVANIA

Last Call—For the Postwar Truck Ballot

CONSTRUCTION engineers and contractors have some very positive ideas about how construction trucks should be designed for their use. A few of these individual comments were reported in *Engineering News-Record*, January 25, 1945, vol. p. 144.

Now, a preliminary analysis can be made of the agreement on improvements most frequently requested.

TRUCK BODIES, CHASSIS *and* FRAMES get the most attention from construction "voters." In their postwar trucks they would like (in percent of those making comments, the "write-in vote"):

1. Cab comfort, durable upholstery, strengthen generally..	14%
2. Overall strengthening	14%
3. Less gingerbread	13%
4. Radiator guards like army trucks	8%
5. Stronger frame	8%
6. Stronger fenders, hood.....	8%
7. Wider rim, tires larger, rugged, special tread	8%
8. Stronger axles	6%
9. Greater range of transmission speeds	5%
10. Stronger clutches	5%
11. More power in low	5%
12. Stronger bumpers	5%
13. Fluid drive	5%
14. Stronger emergency brakes ..	5%
15. Shorter turning radius	5%

The construction TRUCK'S POWER PLANT gets some postwar suggestions, topped by:

1. Make parts accessible for repairs	13%
2. Better oil and air filters	8%
3. Larger radiator	7%
4. Improve fuel pump	5%
5. Larger generator and battery	5%
6. Make engines interchangeable so spare could be put in while working on regular engine..	4%

TRUCK SPECIALS predominating in the "write in" votes include:

1. Power winch	9%
2. Power take-off	6%
3. Dump body convertible to platform	6%
4. Improved wiring, protected lights, utility lights at rear..	5%

The foregoing "improvements" wanted in construction trucks, a composite of over a hundred of the first "write-in" votes to come in, cover those most frequently mentioned. Others will be given in detail in the final report.

A roads and irrigation engineer for a western state has sent in his specifications for a "good truck" which anticipate, by-and-large, the composite construction requirements, he writes:

"A properly built heavy duty 1½-ton truck would fill the bill in most of our work. According to present designs, I would prefer 2 ton.

"I would like gas engine with governor if it could be made to operate satisfactorily over a period of time. Generally our experience with governors has been that they restrict operations in hill usage and cause excessive use of gas and oil.

"Axles and transmissions AND clutches should be of the unit design and heavier than standard. Reduce the speed and increase the starting torque.

"All present trucks are short fuel capacity. Electric standby fuel pumps desirable on snow fighters. High pressure lubrication is satisfactory as is the oil filter, but filter must be mounted to block with no lines to vibrate and break. Larger capacity filters and some method of protecting wiring and air filter from flying snow from plow.

"Hydraulic brakes, 100% oversize present design, with booster. Present balloon pressure tires with larger cross section, wider rim and more space for rear duals between tires.

"Place best available seats and adjustable seats in a cab that will last for more than one season. Use heavy doors with heavier hinges and door posts. Provide adjustments for doors so that they can be tightened and build in high capacity heaters with defrosters on windshield, doors and rear glass. This is important for snow fighting. Standardize power takeoff equipment with adjustable roller bearings. Winches are a must on flat beds.

"Generators and batteries are not adequate at present. Make the motor, transmission, drive shaft and differential in separate units in order that stand-by units can be carried in shop and quickly installed, thus placing truck back in service and the unit can then be repaired later in shop.

"All fenders should be heavier gage material, should be rodded full length at the exposed edges and fastened to chassis with bolts, not self threading screws and stove bolts. Also improve fender bracing so that mud and slush will not accumulate and freeze around wheels. Use heavier frames and run them full length with no reduction in size, extending them well in front of radiator to provide for a real bumper and a grill in front of radiator and lights. For snow fighters provide lights on side or top of cab. Provide recesses for all lights as well as strong brackets for license plates. Windshield wipers can be improved. Raise and protect mufflers. Provide a heavy duty radiator that will stand the twist and vibration of construction work. Provide sufficient tool box for tools and crew dinner pails. Locate the spare tire so that it is convenient, will not freeze in bracket and will not interfere with special attachments such as spreader boxes, snow plows and towing hitches which should also be standard equipment. Insulate the cab for warmth which should also have sound proofing. Ventilate under the hood to keep out exhaust gas and fumes. Leave off the special trim and bright work.

"Perhaps this is too much to expect but it still represents something near my idea of a good truck."

* * *

Construction in 1944 owned and operated 431,802 trucks, 9.1 percent of all trucks 8,171 trailers and semi trailers, 3.8 percent of all trucks, not including trucks or trailers operated by "Government Agencies" or "For-Hire". These totals are from Office of Defense Transportation, as of June 30, 1944. Thus, construction men have a big enough stake in the truck market to warrant getting the kind of trucks they want. A report on these suggestions for improving construction trucks will be made to the truck manufacturers by *Engineering News-Record*. You can still send YOUR "vote" on the features YOU want to Postwar Construction Truck Ballot, Engineering News-Record, 330 W. 42 St., New York 18, N. Y. *This is the last call.*

What do YOU Want in YOUR Postwar Trucks?

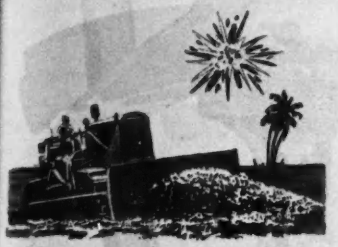
The following questions cover features that construction and maintenance men would like in their trucks to meet their special construction needs. This "ballot" is offered to the readers of *Engineering News-Record* to give engineers and contractors the widest opportunity to express their ideas and preferences.

1. **SIZE: Under or over 2-ton?**
2. **ENGINES: Gasoline or diesel?**
3. **DRIVES, AXLES, TRANSMISSIONS: Standard or special?**
4. **FUELING and LUBRICATING EQUIPMENT:**
5. **BRAKES & TIRES:**
6. **BODIES & CABS:**
7. **ELECTRICAL EQUIPMENT: Are generators adequate? batteries?**
8. **REPAIRS: What parts go first?**
9. **SPECIAL FEATURES YOU want:**

Address replies to POSTWAR CONSTRUCTION TRUCK BALLOT, *Engineering News-Record*, 330 W. 42 St., New York 18, N. Y.

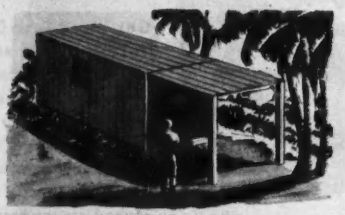
HINES "KNOW HOW"

Gets machines into the fight!



EXPORT BOXES FOR CATERPILLAR . . . . .

For protection in shipment to far-flung fighting fronts, rugged Caterpillar "bull-dozers" are boxed in water-proof containers fabricated, to Army Engineer Corps specifications, by Hines. For this big job, demanding clock-like coordination in lumber supply and manufacturing operations, two production lines in the Edward Hines Lumber Co. Wood Fabrication Plant in Chicago gear Hines "know-how", facilities and equipment to the output of the Caterpillar Tractor Co. in Peoria. The resulting saving in time, effort and money is an outstanding example of Hines' service in expediting the safe delivery of vital equipment to our armed forces all over the world.



SOUTH SEAS "PREFAB" HOUSE

We're told that after Hines export boxes complete their job of delivering Caterpillar tractors safely, they provide shelter for fighting men . . . a fitting end-use for good lumber!

. . . and Fit to Fight!

BOXES FOR TORPEDOES . . . .

Among the many special protective containers, engineered and produced by Hines to meet exacting specifications, were boxes to insure the safe delivery of the delicate propulsion machinery for torpedoes. If you have a production or design problem in wood, get in touch with Hines—we can help you with every phase of the job.

EDWARD HINES LUMBER CO.

CHICAGO, ILLINOIS • ESTABLISHED 1892

More Loads per Day!

MORE OPERATING DAYS PER MONTH!

Servo-type self energizing brakes.
Outside clutches and brakes for accessibility. Self-ventilated for cooler operation.
Cable load is taken directly from drum to housing thru tapered roller bearings.
All gears are spur-type requiring minimum of adjustment.
Sturdy steel housing prevents excessive distortion of parts. Provides lubrication chamber for entire unit.

GAR WOOD Cable CONTROL UNITS

Gar Wood Cable Control Units are engineered and constructed to give unsurpassed performance, under the toughest conditions, with a minimum of "down time" for adjustments. Special emphasis is placed on sturdiness to avoid excessive distortion of case and parts. Every minute detail of this smooth-running unit has plenty of trial and proof back of it. Remember that Gar Wood is the world's largest manufacturer of winches, with years and years of experience. You'll get MORE out of your machines (regardless of make) with a Gar Wood Cable Control Unit. That's not only our claim... ask any user.

GW ROAD MACHINERY is Sold Through ALLIS-CHALMERS Dealers Everywhere

ROAD MACHINERY DIVISION

GAR WOOD INDUSTRIES, Inc.

DETROIT 11, MICHIGAN

OTHER PRODUCTS OF GAR WOOD INDUSTRIES INCLUDE HOISTS AND BODIES • WINCHES AND CRANES • TANKS • HEATING EQUIPMENT • MOTOR BOATS

Elections and Activities

. P. Whitsett, Los Angeles, has reelected chairman of the Metro- an Water District of Southern Cali- ia. Franklin Thomas, director for adena, was reelected vice-chairman. P. Hapgood, director from Anaheim. named secretary.

The following officers of the Ft. rth, Tex., Technical Club have been alled: C. Milo Thelin, president; k A. Knapp, first vice-president; n H. Scully, second vice-president; G. Hanson, treasurer; Clyde W. ker, secretary; and Guy E. ughon, O. G. Carlson, J. B. Calder C. Milo Melin, directors.

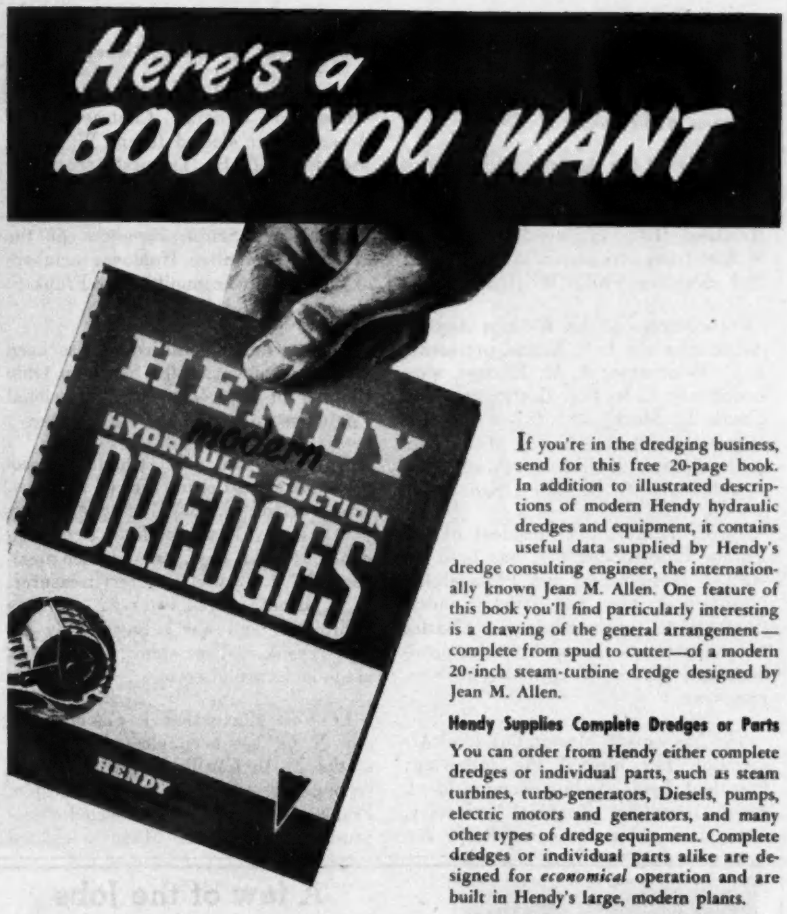
The British Columbia lieutenant- ernor appointed T. H. Crosby, Van- ver; G. C. Lipsey, Britannia Beach; A. Forward, Vancouver; and R. A. Lachlan, North Vancouver, mem- s of the Council of the Association Professional Engineers.

New officers of the Georgia section of American Society of Civil Engi- rs are: President, M. T. Thomson; e-president for Atlanta chapter, H. Perkins; vice-president, Georgia tion, Col. F. W. Altstaetter; secre- y-treasurer, R. O. Harris, directors. C. Prather and Paul Weir.

Officers of the Springfield, Ill., En- eers Club are: J. H. Smelter, presi- nt; H. E. Modrow, first vice-presi- nt; E. S. Rynearson, second vice- sident; H. R. Helmle, secretary- asurer.

Stephen C. Hale, Atlanta has been talled as president of the Georgia ciety of Professional Engineers. her officers are: Carl W. Evans, At- nta, first vice-president; Albon Gru- r, Savannah, second vice-president; y L. Sweigert, secretary; John A. dd, treasurer; and R. S. King, na- nal representative. Directors are: l. M. L. Blew, Cherry L. Emerson, menico P. Savant, C. E. Layton, R. Pool and Carl Schofield.

The Central Texas Chapter of the ciety of Professional Engineers at co, Tex., has elected these officers: H. Caldwell, president; Harry L. ner, first vice-president; E. L. Kill- sworth, second vice-president; and C. Wood, secretary-treasurer. Di-



If you're in the dredging business, send for this free 20-page book. In addition to illustrated descriptions of modern Hendy hydraulic dredges and equipment, it contains useful data supplied by Hendy's dredge consulting engineer, the internationally known Jean M. Allen. One feature of this book you'll find particularly interesting is a drawing of the general arrangement—complete from spud to cutter—of a modern 20-inch steam-turbine dredge designed by Jean M. Allen.

Hendy Supplies Complete Dredges or Parts

You can order from Hendy either complete dredges or individual parts, such as steam turbines, turbo-generators, Diesels, pumps, electric motors and generators, and many other types of dredge equipment. Complete dredges or individual parts alike are designed for *economical* operation and are built in Hendy's large, modern plants.

Send today for your free copy of the dredge book. Address Dredge Dept., Joshua Hendy Iron Works, Sunnyvale, California.

JOSHUA **HENDY** IRON WORKS
ESTABLISHED 1856
SUNNYVALE, CALIFORNIA

UNIT
5 TON
mobile
CRANE
SELF-PROPELLED
Powerful, fast-stepping Mobile Crane . . . one-man operated . . . for "on and off" highway operations . . . simple to operate . . . (eliminates cut-up terrain, mutilated concrete decks and runways.)
Write for particulars.
UNIT CRANE & SHOVEL Corp. MILWAUKEE 14 WISCONSIN

rectors, Alan Love, N. E. Trostle, Coy Borders, and Lee Clayton. R. M. Sherman, outgoing president, automatically becomes a director.

Officers of the American Institute of Consulting Engineers, New York, have been elected as follows: President, E. Rowland Hill; vice-president, George S. Armstrong; treasurer, James Forgie; and secretary, Philip W. Henry.

New officers of the Western Asphalt Association are J. R. Keane, president; J. R. Pemberton, R. M. Blodget, vice-presidents; C. W. Powell, treasurer, and Frank L. Mark, all of Los Angeles. Directors re-elected are S. M. Griffith, A. F. Brough, Keane and Powell, Los Angeles, and G. R. Daley, San Diego.

H. C. Turner, vice-president of the Turner Construction Co., has been re-elected president of the Philadelphia Chapter of the Associated General Contractors of America. Charles Schwertner was named first vice-president and Wynne Murphy second vice-president.

The Milwaukee Master Builders' Association has elected the following: President, Louis Fischer; vice-president, Alvin Drescher; financial secretary, Anton J. Winkler; treasurer, Ralph Zittleman; and secretary, Richard Ferge.

Members of Intermountain Branch, Associated General Contractors of America have elected Joseph W. Grant, president; J. H. Tempest, secretary-treasurer; Ted C. Jacobsen, vice-president, and Clarence Waterfall and Charles W. Smith, members of the executive committee. Holdover members of the executive committee are Frank B. Bowers and Ed Clyde.

Ernest Gerber, Chillicothe, has been elected president of the Southern Ohio Chapter of the Society of Professional Engineers, succeeding P. E. Fuller.

The Portland, Ore., Chapter, Associated General Contractors of America, has elected: S. S. Montague, president; L. A. Peacock, first vice-president; Donald Hall, second vice-president; M. J. Lynch, secretary-treasurer. J. A. Lyons retired after 22 years as a director, and was succeeded by his son, Frank. The elder Lyons was made honorary director.

Lt. Col. Meriwether Lewis of Kinston, N. C., has been elected president of the North Carolina Society of Surveyors. He succeeds R. S. Gillespie. Frank Blanchard was elected vice-president and C. L. Mann re-elected secretary-treasurer. Mr. Mann is head of the Department of Civil Engineering at North Carolina State College.

The Queens County Chapter of the New York State Society of Professional Engineers has elected: President, William C. Kochendoerffer; first vice-president, Frank Lilien; second vice-president, Charles B. Molineaux; treasurer, Charles S. Stratton; financial secretary, Thomas J. Graham; executive secretary, Karl Vaupel; and historian, Marie Reith. Directors, Walter R. Donohue, Alexis J. Mortola, Thomas D. Eaton, Arthur D. Shaw and Franklin J. Johnson.

L. B. Butterfield, San Diego, Calif. has been elected president of the San Diego Chapter, Associated General Contractors of America, succeeding F. E. Young. The new vice-president is E. F. Bryans. Additional directors named are B. R. Hazard, Walter Trepte, and F. E. Young.

Officers of the South Carolina Society of Engineers are Claude R. McMillan, Columbia, president; H. E. Glenn, Clemson, vice-president; A. E. Johnson, Columbia, re-elected secretary-treasurer. Directors are: W. J. Gooding, Columbia, I. A. Trively, Clemson, and F. B. McDowell, Charleston.

Bush Hammering Concrete Surfaces

A few of the Jobs

SYNTRON

ELECTRIC HAMMERS

can do for You!

in addition to drilling Concrete

Quickly—Easily—Economically

3600 Powerful Blows Per Minute from ordinary 110 volt A.C. lighting current.

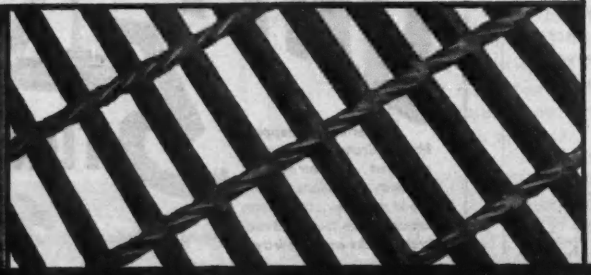
Illustrated and described in Catalog No. 450

Vibrating Concrete Forms

SYNTRON CO. 328 Lexington, Homer City, Pa.

NO OTHER GRATING LIKE IT!

BLAW-KNOX ELECTROFORGED STEEL GRATING



Actually Blaw-Knox Grating is a one-piece, electroforged steel "material" which can be made to measure or cut to fit . . . Note these exclusive features:

1. Self-cleaning, no sharp corners to clog.
2. Maximum open area for light and air.
3. Easy to maintain . . . paint reaches entire surface.
4. Rigid electroforged construction means easy installation.
5. Twisted cross bar provides safe footing at all times.

Write for catalogue and sample

BLAW-KNOX DIVISION of BLAW-KNOX COMPANY · 2001 FARMERS BANK BUILDING, PITTSBURGH, PA.

Announcing

NEW COMPACT ★ HEAVY DUTY CLIMAX BLUE STREAK ENGINE

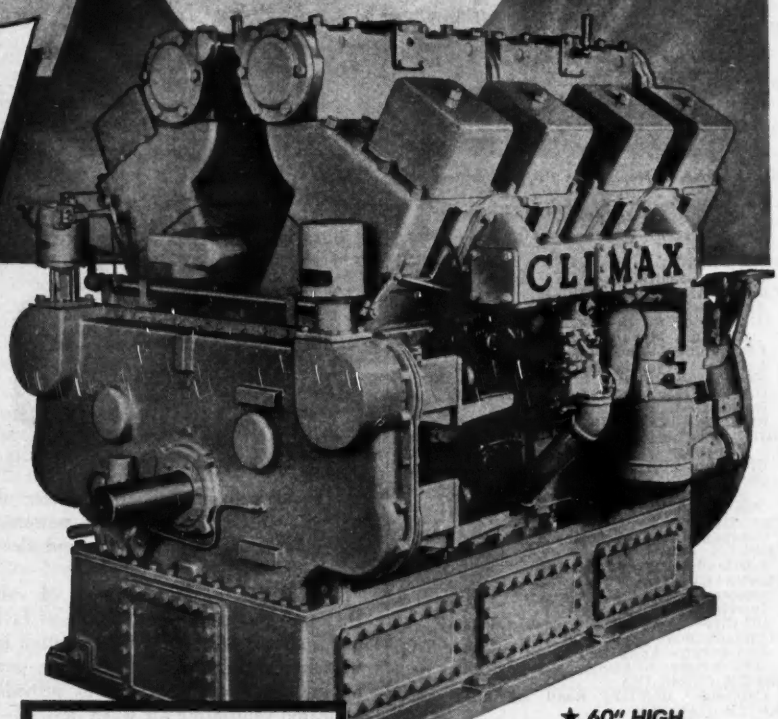
330 [illegible] at 1200 r.p.m.

Climax Built-in Extras AT NO EXTRA COST!

1 Hi-Power Blue Streak Combustion (exclusive).

2 Hi-Efficiency Dual Carburetion.

3 plus Staying Power—the ability to keep on doing the job.



★ 60" HIGH
★ 72" LONG
★ 51½" WIDE

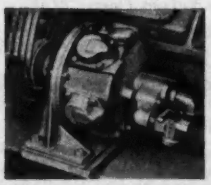
HERE IS BRUTE POWER—in small space—to operate heavy duty mobile or stationary equipment used in oil fields, construction, marine and industrial operations—to power deep-drilling rigs, locomotives, cranes, shovels, boats, generators, air compressors, water and sewage pumps, blowers, etc.

This Climax valve-in-head Blue Streak V8 (8 cylinder, 4 cycle, 7" bore, 60°) Engine is a sturdy, instant-starting, fast-accelerating, smooth-running, flexible prime mover that operates on gasoline, butane, by-product or natural gas. It runs at slow, minimum-wear speeds, at low, safe temperatures in all climates on very little water.

This new V8 promises to sustain Climax Engine records of 7, 9, 10 years' trouble-free service—as much as 60,000 hours of continuous operation with no shutdown for repairs.

For complete operation and specification bulletin, write Climax Engineering Company, Clinton, Iowa.

CLIMAX ENGINEERING COMPANY
General Offices: CLINTON, IOWA
Factory Offices: CHICAGO, DALLAS, FT. WORTH, TULSA



AIR START now available, belt connected or built-in, according to engine size, on all Climax Blue Streak Engines. Choice of air start or gasoline starting optional.

climax
BLUE STREAK ENGINE
Builder of Climax DIESELS and GENERATING SETS

CLIMAX ENGINEERING COMPANY

Here Is Your Nearest Worthington Distributor

For Sales, Rentals and Service on BLUE BRUTE Portable Compressors, Rock Drills and Air Tools.

See full page ad page 105

ALABAMA
Birmingham—Tractor & Equipment Co.
ARIZONA
Phoenix—Smith Booth Usher Company
ARKANSAS—Fort Smith—R. A. Young & Son
Little Rock—R. A. Young & Son
CALIFORNIA
Los Angeles—Smith Booth Usher Company
San Francisco—Edward F. Hale Company
CONNECTICUT
Hartford—The Holmes-Talcott Company
GEORGIA
Atlanta—Tractor & Machinery Co., Inc.
INDIANA
Indianapolis—Reid-Holcomb Company
IOWA—Des Moines—Electrical Eng. & Constr. Co.
KENTUCKY—Harlan — Hall Equipment Sales.
Louisville—Williams Tractor Company
LOUSIANA
New Orleans—Wm. F. Surgi Equipment Company
MARYLAND
Baltimore—D. C. Elphinstone, Inc.
MASSACHUSETTS
Cambridge—W. W. Field & Son, Inc.
Springfield—The Holmes-Talcott Company
MICHIGAN
Detroit—W. H. Anderson Company, Inc.
Muskegon—Lakeshore Machinery & Supply Co.
MINNESOTA
Minneapolis—Phillippi-Murphy Equipment Co.
MISSOURI
Kansas City—Machinery & Supplies Company
MONTANA—Helena — Caird Engineering Works
NEW JERSEY
Hillside—P. A. Drobach
North Bergen—American Air Compressor Corp.
NEW MEXICO
Roswell—Smith Machinery Company
NEW YORK
Albany—Larkin Equipment Company
Albany—T. Southworth Tractor & Machy. Co., Inc., Menands
Binghamton—MacDougall Equipment Co.
Buffalo—Dow & Company, Inc.
New York—Hubbard & Floyd, Inc.
Olean—Freeborn Equipment Company
Oneonta—L. P. Butts, Inc.
Syracuse—Harrod Equipment Company
OHIO—Cincinnati—The Finn Equipment Company
Cleveland—Gilson-Stewart Company
Marietta—Northwest Supply & Equipment Co.
Toledo—M. W. Kilcorse & Company
OKLAHOMA
Oklahoma City—Townsco Equipment Co.
OREGON
Portland—Andrews Equipment Service
PENNSYLVANIA
Easton—Sears & Bowers
Harrisburg—N. A. Coulter
Oil City—Freeborn Equipment Company
Philadelphia—Metalweld, Inc.
Pittsburgh—Atlas Equipment Corp.
Wilkes-Barre—Ensminger & Company
SOUTH CAROLINA
Columbia—Bell-Lott Road Machinery Co.
SOUTH DAKOTA
Sioux Falls—Empire Equipment Co.
TENNESSEE
Chattanooga—James Supply Company
Knoxville—Wilson-Weesner-Wilkinson Co.
Memphis—Tri-State Equipment Company
TEXAS—Dallas—Shaw Equipment Company
El Paso—Equipment Supply Company
Houston—Dye Welding Supply Co.
San Antonio—Patten Machinery Company
VIRGINIA
Richmond—Highway Machinery & Supply Co.
WASHINGTON
Seattle—Star Machinery Company
Spokane—Andrews Equipment Service
WEST VIRGINIA
Fairmont—Interstate Eng. & Constructors
WYOMING
Cheyenne—Wilson Equipment & Supply Co.

Get more WORTH from air with WORTHINGTON

Worthington Pump and Machinery Corp.

New Aids to the Constructor

Elevating Endgate

Power loading on trucks and truck trailers is now possible by means of a new elevating endgate. Hydraulically driven by power from the truck engine, this device is well suited for heavy materials, having a capacity up to one ton, and makes it possible for one man to load and unload objects generally requiring several men. Time required is also shortened, it is claimed.

The sturdy steel endgate is controlled by levers at the rear of the vehicle. A shift of one lever smoothly raises the load to truck-floor level or ground.—*Fruehauf Trailer Co., 10940 Harper Ave., Detroit 32, Mich.*

• • •

Enclosed Heater

Serving to heat vehicles and other ground equipment, as well as warming up machinery, the new Model AT-1000 vehicle heater has a heat output of 20,000 BTU. The unit, measuring only

15 in., with an outer shell diameter of 6⅛ in., weighs 17 lb. and is powered by an integrally designed fan and electric motor.

Installation of the 6, 12 or 24 volt D.C. unit requires only a supply of fuel and a source of electricity; operation is fully automatic and the heater fan can be independently operated to provide unheated ventilating air when desired—*Herman Nelson Corp., Moline, Ill.*

• • •

Steel Window Insert

To speed up steel frame window erection, avoid cement painting, prevent corrosion of frame and eliminate additional caulking, a new patented steel window insert or mastic surround, according to the manufacturer, has indications of becoming universal practice for installing steel windows in buildings composed of concrete or concrete frame, faced with brick. Formed of Armco ingot iron and furnished in two types, the surrounds are attached to the forms before concrete is poured and provide a recess in the jambs and across the heads of the finished openings. In the recess a plastic fill is placed.

When the window is installed, it is raised until inserted into the plastic fill at the head, after which the jamb of the window is placed into the jamb surround.—*The William Bayley Co., Springfield, Ohio.*

• • •

Acid-Resistant Glass

Hydrofluoric acid that disintegrates ordinary glass will not affect a new glass, according to the manufacturer's

announcement. This simplifies handling of the acid, formerly shipped in lead or wax containers and processed in platinum or gold retorts, which prevented visual observance of chemical reactions.

A piece of the glass, immersed in hydrofluoric acid for 500 hours, remained substantially transparent; ordinary glass became a chalky mass. Made without sand, but with phosphorus pentoxide, this glass has about the same melting and working properties as ordinary glass.—*American Optical Co., Southbridge, Mass.*

• • •

Heating and Ventilating System

A new type of heating and ventilation, especially adapted to use in schools and similar public buildings features a stoker-fired hot water low pressure boiler with the hot water circulated by high duty centrifugal pumps. An individual pump, circulating the hot water through a one-pipe system of heat distribution, serves each section of a building.

The units, encased in light steel Lind-

A New Blue Brute for New Rock-Busting Jobs

Enough crushed rock for today's needs plus those of the postwar future (like Pennsylvania's $500,000,000 Postwar Highway Program, for example) is an order that will take plenty of top-rate drilling.

Already Worthington's improved UMW Wagon Mounting with its 4" WD-40 Drifter is keeping quarries hot with its speedy, powerful, easy drilling. It's the wagon mounting you'll want for your new jobs — and, like other Blue Brute products, it's available today.

This UMW-40 is the most versatile machine in the business. Drills holes in any direction and at any angle. U-arm may be swung in any position from vertical to 45° below horizontal. Two rear wheels may be turned through 90°, thus permitting line drilling close to a face. 6-foot nominal steel change.

Its many other advantages — plus the savings in maintenance cost you get with portable Blue Brute Compressors — the ones with the famous easy-breathing Feather* Valves — mean more air per compressed air dollar and more holes drilled per day.

Investigate Blue Brutes. Try 'em—buy 'em. Nearest distributor listed on p. 104.

*Reg. U.S. Pat. Off.

**Blue Brute Compressors and Air Tools are painted olive-drab for the Army and battleship-gray for the Navy.

Behind the Fighting Fronts with

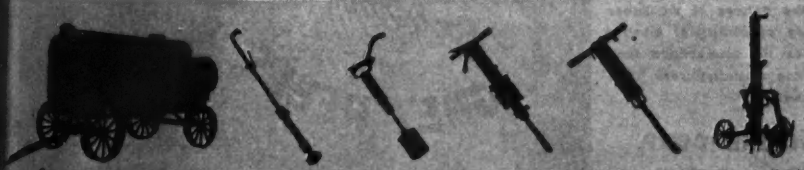
Blue Brutes

In today's mechanized warfare, Blue Brutes** help prepare the way — repair bridges, roads, tunnels, set up fighting positions, build landing fields. At home, in Army Camps, Navy bases, Blue Brutes are at work. They'll be ready, postwar, for the construction projects now being planned for peacetime jobs and improvements.

Get more WORTH from air with WORTHINGTON

Buy Blue Brutes

2491-B-2



Compressors from 60 to 500 cu. ft. capacity in mountings to suit all jobs. Rock Drills and Air Tools that have always set the pace for easy operation — available in a wide range of weights and sizes.

WORTH BEHIND THE WORK
WORTHINGTON

Worthington Pump and Machinery Corporation, Construction Equipment Department, Holyoke, Massachusetts

say Structure housings, are designed for installation in furred spaces in the inside wall. The heating system also uses louvers and grills instead of radiators.

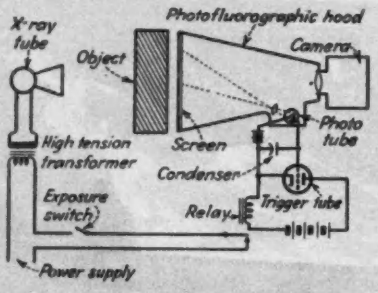
When critical materials are again available, air purifiers can be installed. With the Lindsay Structure panel type of construction, assembled without riveting or welding, individual panels or the entire backing of the housing may be quickly removed and replaced, using only standard tools.—*Russell R. Gannon Co., Manufacturing Division, Cincinnati, Ohio.*

• • •

Electronic Timer for X-Rays

Increasing operating efficiency 100 percent and producing uniformly dense photofluorographic exposures, a new electronic timer regulates X-ray exposures automatically. In effect, the device solves a problem involving five variables: (1) thickness of the object; (2) exposure time; (3) X-ray tube voltage; (4) X-ray tube current; and (5) distance from X-ray tube to fluorescent screen.

Consisting of a lens which scans the fluorescent screen the phototube camera mounted beneath the photofluorographic hood is activated by the object image on the screen, which is being photographed by the camera at the apex of the hood. Light from the screen initiates a small current in the photoelectric tube which is greatly amplified.



The output current charges the condenser until the proper ionization voltage is reached, when the thyratron actuates the relay which opens the X-ray circuit and terminates the exposure. Proper choice and design of circuit constants enable the timer to maintain the correct exposure factor for uniformly dense film exposure.—*Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.*

• • •

Self-Bonding Floor Material

A new colloidal composition is said to give great resistance to Stonoleum, a recently introduced self-bonding floor material. This substance, which feels like rubber and wears like stone, can be laid over old concrete, wood or composition floors, without adhesives. Another characteristic is its "self-healing" feature; small holes left when machinery or furniture are moved disappear under traffic.

Laid Saturday, Stonoleum floors may be used on Monday. No chipping is needed, and it can be applied with ordinary leveling tools.—*Continental Asbestos Refining Corp., 1 Madison Ave., New York, N. Y.*

• • •

Rivet Passer

White hot rivets are shot through the new Penflex pneumatic rivet passer quickly, safely and accurately up to 125 ft. or more, it is claimed. A hot rivet placed in a valve in the head opens the valve and drops through, the valve closing automatically behind it. Foot pressure on the treadle forces the rivet, by compressed air, through the hose to the receiver.

This rivet passer is used extensively in shipyards and in bridge erection.—*Pennsylvania Flexible Metallic Tubing Co., 7203 Powers Lane, Philadelphia 42, Pa.*

Speed Up
HANDLING OPERATIONS
Ingenuity in developing amazing portable docks speeded the invasion of Europe. Similarly, inbuilt features of design in Owen Buckets speed up the digging and handling capacities of these popular buckets. Buy Owens for resultful operation.
The OWEN BUCKET Company
6010 Breakwater Avenue • Cleveland, Ohio
BRANCHES: NEW YORK PHILADELPHIA CHICAGO BERKELEY, CAL.
OWEN BUCKETS
A MOUTHFUL AT EVERY BITE

The Rud-o-Matic Combination Magnet Reel and Tagline is a radical departure from the usual reel, something which is brand new and which no one else can offer. It is operated on a string principle for tension. Tagline cable is attached to magnet with sufficient tension to steady, then electric cable is fastened to connections on magnet, leaving same a little slack. As both drums revolve together, electric cable always maintains the degree of slackness originally set. This feature eliminates any possibility of electric cable being pulled apart or jerked loose from the connections, thus insuring a long life for it. Most of the crane manufacturers have adopted Rud-o-Matics as standard equipment.

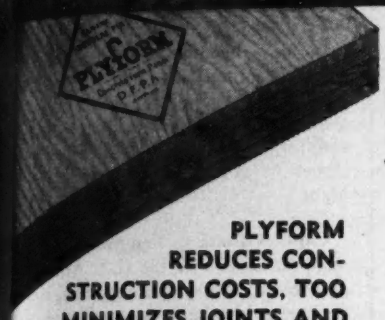
McCAFFREY-RUDDOCK TAGLINE CORP.

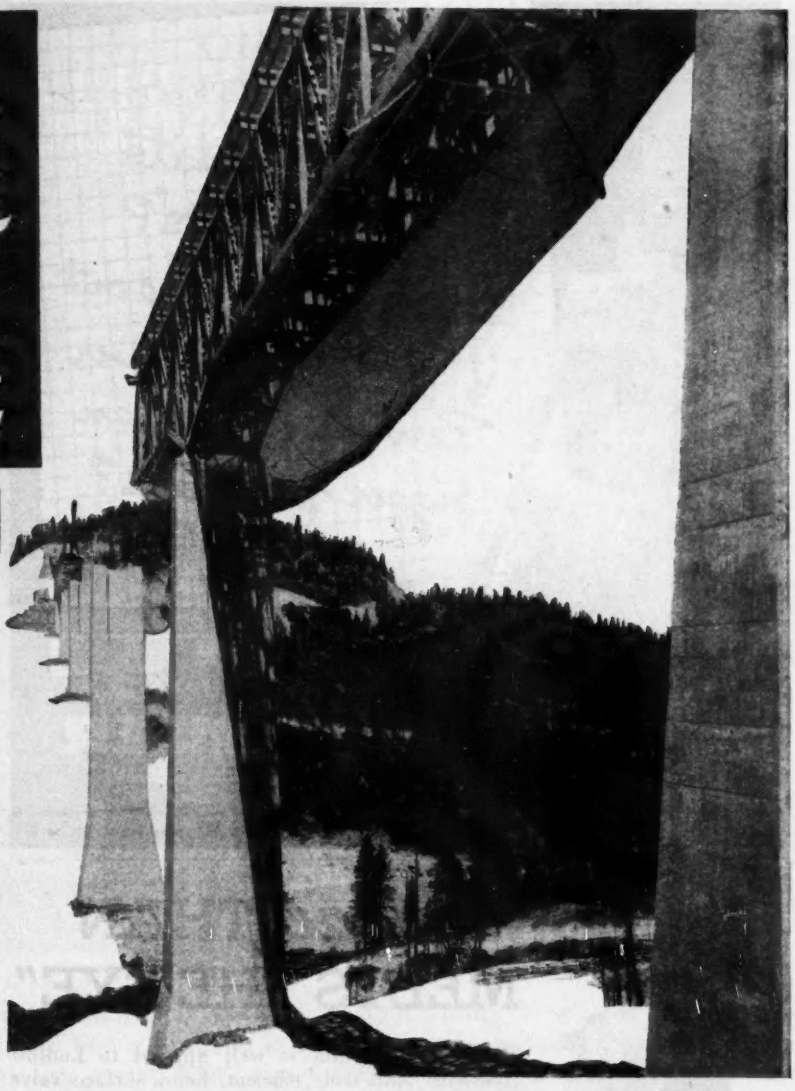
2121 East 25th Street Los Angeles 11, California

TRACTOR & MCNEY. CO. Atlanta, Ga. A. H. COX & CO. Seattle FORSYTHE EQUIP. CO. Long Island City, N. Y. CONLEY EQUIP. CO. Philadelphia, Pa. W. E. PHILLIPS Detroit, Mich. L. L. HANSON Chicago, Ill. OWEN BUCKET CO., LTD. Berkeley, Calif.

Get As Many As 15 Re-Uses with Plyform

– the universally standard multiple-use concrete form material





PLYFORM REDUCES CONSTRUCTION COSTS, TOO —MINIMIZES JOINTS AND GIVES A SMOOTHER FINISH!

Contractors experienced in their use report as many as 15 re-uses with Douglas fir plywood PLYFORM concrete form panels! For these strong, large-size panels are made with highly water-resistant glues, especially for concrete form work.

PLYFORM possesses great rigidity, too. A load of 500 pounds per square foot on a ⅝" panel, with joists 12" apart, deflects less than 4/1000 of an inch.

Both faces of a Plyform panel are sanded to a satiny smoothness. This, together with the large panel size, means smoother concrete surfaces with a minimum of joints—reducing rubbing and finishing time. Construction costs, too, are reduced because the standard PLYFORM panels cover 32 square feet per unit, yet are so light in weight that one man can easily handle them.

Write for an interesting free booklet "Concrete Forms of Douglas Fir Plywood", containing complete technical and engineering data. Douglas fir plywood engineers will be glad to assist you in solving any special problems relating to the use of this proven form material.

The McMillan truss-type Bridge in Washington was formed against strong, rigid PLYFORM panels.

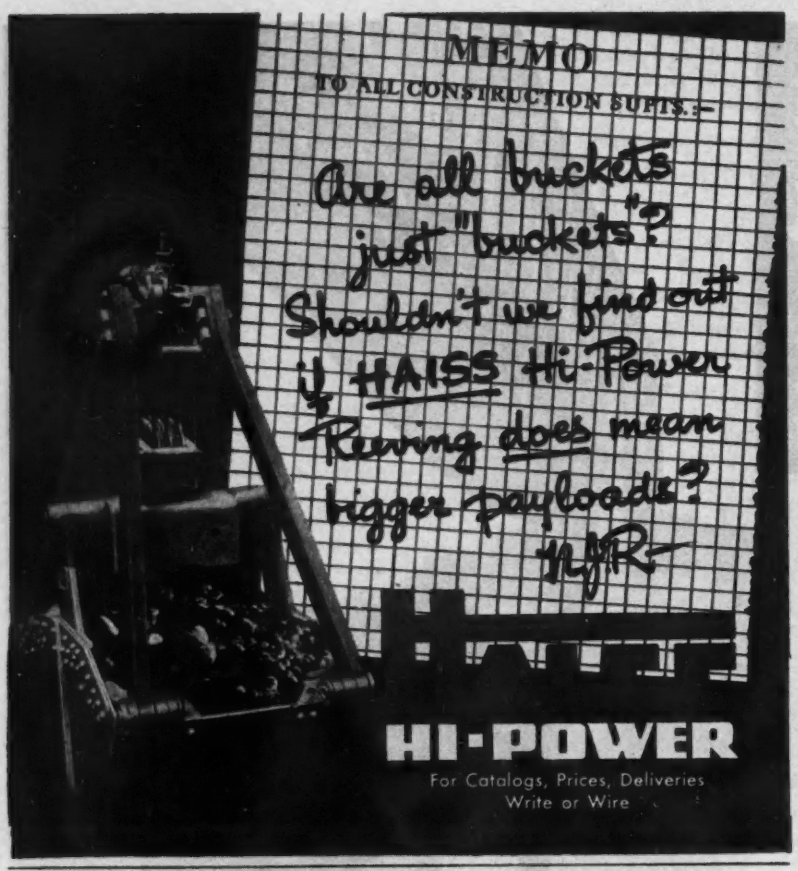
The smooth, interesting effects on the Natchez, Miss., bridge approach were made possible by durable PLYFORM.

Douglas fir plywood PLYFORM panels are "Grade trademarked" with the diamond-shaped stamp shown. Every panel also has a distinctive green edge-sealing. All panels are oiled and edge-sealed at the mill unless otherwise specified.

GENUINE DOUGLAS FIR PLYFORM Concrete Form Panel D. F. P. A. INSPECTED

NOTE: In special cases where an absorptive form liner may be required (as in the spillway apron on a dam) PLYFORM is the ideal form backing — rigid, strong smooth. And the panels may be re-used many times, even after the absorptive liner has been discarded.

Douglas Fir Plywood Association Tacoma 2, Wash.



"More THAN MEETS THE EYE"

The old description is well applied to Ludlow Hydrants. And their efficient, below-surface valve parts are designed to *remain* unseen—indefinitely. Operating on the slide gate principle, developed and perfected by Ludlow, they are simple, strong, sure. Once they're under ground you can forget about them.

Built for:

quick water
proper drainage
easy inspection

Ludlow Hydrants stand guard over water systems with a dependability that guarantees security for generations to come.

It's time *now* to plan postwar improvements and additions to your community's water system. Let us send you full information on Ludlow Hydrants and Valves. Or consult us, without obligation, at any time. H-3

The LUDLOW VALVE MFG·CO·INC· SINCE 1866 TROY·N·Y·

MEN AND JOBS

Assignment of **Lt. Col. Frank C. Carey** as engineer and demolition officer, Panama Canal Department, has been announced. He succeeds **Col. Ross E. Windom,** who will return to the United States for reassignment.

Lt. Col. Carey had been associated with the New Orleans Engineer District, and was chief of the engineering division when he was commissioned in the Army in 1942. He continued in the same position until he was assigned to overseas duty. His work was in connection with river-and-harbor and flood control.

Capt. Robert F. Long, chief of the contract termination division of Denison, Tex., District Army Engineers, has been transferred to Karnack, near Marshall, where he will serve as resident engineer on construction of a munitions plant.

Capt. William E. Van Sprinkle, Durham, N. C., is with the U. S. Army Engineers in Europe, and was among those engineers who built the breakwaters in England which were floated across the Channel after D-Day for harbors improvised at Normandy beachheads.

Donald Heffelfinger, former Alliance, Ohio, safety-service director, will be appointed to the newly created post of engineer-superintendent of the sewerage and water departments.

1st Lt. Joseph C. Webber, former Toledo, Ohio, city engineer, has been appointed commanding officer of an aviation engineer petroleum distribution unit in Italy. At one time he was construction engineer on Boulder Dam.

William N. Beard of New Bern, N. C., has been promoted to colonel from lieutenant colonel at Camp Ellis, Ill., where he commands the 1332d Engineer Regiment. Colonel Beard was graduated from the U. S. Military Academy in 1936 and later attended the Massachusetts Institute of Technology and at the Engineer School at Fort Belvoir, Va. For over a year, he served with the Engineers in North Africa.

Henry Crown has been promoted from lieutenant colonel to colonel. With the Corps of Engineers, he is chief of military supply for the Great Lakes division.

Frank Thatcher, Wilmington, Ohio, has been named acting Clinton County engineer, during the absence of **D. Robert Conard,** recently inducted into the Army.

DIESELS *by Sterling*

NOW ON THE PRODUCTION LINE

...WHEN DO YOU WANT YOURS?

★ So great has been the interest in the new Sterling Viking Diesel that we have already set up production line methods of manufacturing this advanced streamlined engine. This means we can accept orders now for early delivery of this modern improved power plant for operating electric generators, water pumps, draw bridges, dam sluices, shovels, bulldozers, snow plows and many other power applications. Sterling engineers will gladly cooperate in planning installations of the Sterling Viking Diesel best suited to your particular requirements—six or eight cylinder; supercharged or unsupercharged. Write for illustrated engineering bulletins.

Other Sterling engines—gasoline, gas, butane and Diesel, from 85 to 1800 horsepower—also available.

"KEEP BUYING WAR BONDS"

STERLING

VIKING DIESEL

STERLING ENGINE COMPANY, 1275 NIAGARA ST., BUFFALO 13, N. Y. *Offices in New York, Washington and Chicago*

HI-
DENSITY
NOT A PHRASE
BUT A FACT
and a fact that's important to YOU, who depend upon pencils for blueprints that do justice to your skill. The finer grain in HI-DENSITY Microtomic Leads results in sharper, clearer lines with less pressure . . . and easier erasures. Use Microtomic "Van Dyke" and be certain of foolproof reproductions.
MICROTOMIC
VAN DYKE
DRAWING PENCILS
The EBERHARD FABER Drawing Pencil in 18 degrees, 7B to 9H . . . plus 6 degrees with special Chisel Point Leads

Manufacturers' Activities

ANNOUNCEMENT has been made of the appointment of Lowell E. Sennet to succeed John L. Sybrandt, for many years manager of the Chicago Office of The Ludlow Valve Manufacturing Co., Inc. Mr. Sennet is an engineer with long experience in valve applications. He was graduated from the Case School of Applied Science and has previously been with the engineering departments of the Grinnel and Crane companies. This announcement was made jointly by A. W. Thompson, president, and Robert Bischoff, sales manager of Ludlow.

JOSEPH H. DIXEY has severed his connection with the Transit Mix Concrete Corp. of 500 Fifth Ave., New York City. His future plans have not been announced.

LEROY PETERSEN, executive vice-president of Otis Elevator Co. has been elected president to succeed the late Jesse H. Van Alstyne. Edward A. Fitch, vice-president, was made a member of the board of directors.

Mr. Petersen has been with Otis since 1921, serving in various sales and executive posts, including vice-president in charge of industrial sales. He was elected executive vice-president in 1943.

Mr. Fitch started with Otis at its Yonkers, N. Y., works in 1899. He was works manager for a number of years and was elected vice-president in charge of manufacturing in 1925. Both the new president and the new director are directors of the Otis-Fensom Elevator Co., Ltd., of Canada.

A LETTER, recently received from Lt. Curtis C. Fanning, S.R.A.U. in India, addressed to the Iowa Manufacturing Co., was concerned with "The Spirit of Cedar Rapids," a complete rock-crushing unit made by the employees of that company on their own time and presented to the United States Army Engineer Corp in memory of Louis M. Parks, their fellow-worker who gave his life early in the war. Lieutenant Curtis said: "I thought possibly you would be interested in knowing the location of 'The Spirit of Cedar Rapids.' I recently came across that machine in an Engineer depot here in India. You may rest assured that it will be put to good use. At present, it is in apparent good order. It is good to know that you people are winning the battle on the home front. Without your help victory could never be ours."

WILLIAM K. HOLT of San Antonio, Tex., has been elected a director of the Tyson Bearing Corp. He is president of the William K. Holt Machinery Co. of San Antonio, one of the largest distributors of heavy construction machinery in the southwest.

Following many years with the Holt Manufacturing Co., forerunner of the Caterpillar Tractor Co., he founded the Mexico Tractor & Machinery Co. of Mexico City. He was president of that organization until he resigned to form the San Antonio concern in June 1933.

SYDNEY A. FOSTER, 58, vice-president, L. B. Foster Co., Pittsburgh, Pa. and for many years manager of its New York office, died recently in New York.

R. E. FRITSCH, vice-president of Tube Turns, Louisville, Ky., since 1929, has been elected president, succeeding Walter H. Girdler, Sr., who died on Jan. 7. Mr. Fritsch joined Mr. Girdler when Tube Turns was organized and has had a major part in the firm's rapid growth.

Mr. Fritsch continues as vice-president and a member of the board of directors of The Girdler Corp. of which Tube Turns is an affiliate. He is a member of the American Society for Metals and the American Welding Society.

T. F. RAHILLY, adviser to the Steel Controller of Canada for the last two years, and formerly general manager of the Algoma Steel Corp. at Sault Ste Marie, Ont., has been appointed vice-

sident and general manager of the onto Iron Works, Ltd.

UNITED STATES STEEL CORP. plans to nd $50,000,000 on postwar improve- nts to its mills in Gary, Ind., accord- to Irving S. Olds, chairman of the rd of directors. Improvements in- de additional equipment for handling materials at Gary Works, increased acity for the production of cold re- ed tin plate at the Gary Sheet and Mill, and rebuilding and moderniza- of the bridge and structural steel ricating plant at the American dge Company, said Mr. Olds.

THE EICHMY EQUIPMENT CO., Ro- lle, Ill., has announced the appoint- nt of J. B. Beatty as manager of the struction machinery division. Mr. atty recently resigned from the War oduction Board where he served as as- tant chief of the track-type tractor tion in Washington and manager of construction machinery division in Chicago regional office.

The Eichmy Equipment Co. is exclu- e distributor in Northwestern Illinois the Link-Belt Speeder Corp., Chain lt Co., Universal Engineering Corp., d Davey Compressor Co. It is also tributor in southwestern Wisconsin the Link-Belt Speeder Corp., Davey mpressor Co. and Gruendler Crusher.

JOHN R. MUNN, a director of the astic Stop Nut Corp. of America since 927, has been hosen president the company to ceed the late illiam T. Hed- nd.

Mr. Munn, who also chairman the board of unn & Steele, c., manufactur- s of insulating terials, is a past president of the rinceton Engineering Association.

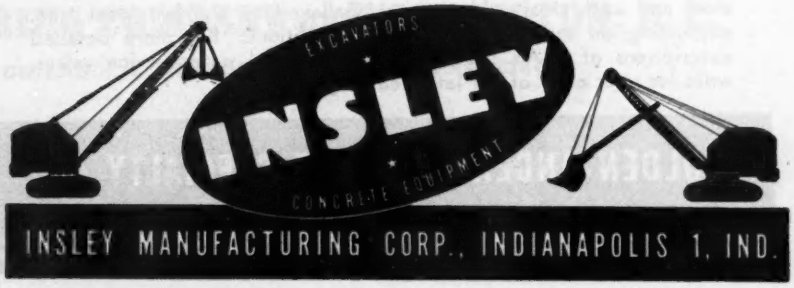
FREDERICK BELL MCBRIER, 71, di- ctor of Bucyrus-Erie Co., Erie, Pa., d recently. He started in business ith his father, founder of the Ball ngine Co., over 40 years ago. He be- me vice president and general man- er of the Erie Steam Shovel Co., ccessor to Ball Engine Co., until it as merged to become the Bucyrus-Erie o.

ADDITIONAL DISTRIBUTORS for the ood Roadmixer, traveling mixing ant, as announced by the Wood Manu- cturing Co., Los Angeles, Calif. are: he G. W. Van Keppel Co., Kansas ity, Mo. and Herman M. Brown Co., es Moines, Ia.

No Tipping

The Insley Excavator's unusual hook roller construction offers two outstanding advantages. Three hook rollers are provided to secure the revolving frame to the lower frame. Their location, one in front and two in the rear, prevents the revolving frame from tipping . . . assures proper balance on rough ground and under heavy load. More than that, this hook roller construction also extends the life of the equipment because it relieves the center pin of all vertical stress . . . requires it to take *only* the horizontal shear load.

As in this one particular instance, you'll find that every detail of Insley's design and construction makes an important contribution to dependable, low-cost performance on the toughest jobs—dirt, rock or what have you! That's why it will pay you to get all the facts on ⅜ and ½-yd. Insley Type K Excavators.



INSLEY MANUFACTURING CORP., INDIANAPOLIS 1, IND.

GOLDEN-ANDERSON

CAN SUPPLY THEM FOR

EVERY WATERWORKS SERVICE!

Water Pressure Reducing Valves

. . . In Base Pilot or Globe Pilot patterns—sizes from 3" to 36", to handle working pressures from 150 to 400 lbs.

Check and Relief Valves

Angle or Globe Patterns, equipped with Base Pilot Control Valve or Globe Pilot. Sizes from 3" to 36" for pressures from 150 to 400 lbs.

Altitude Control Valves

. . . supplies in Single Acting, Double Acting and Electric types in standard, semi-throttling, stop-check, stop-starter unloading and relief design. Sizes from 2" to 36" to handle pressures from 150 to 400 lbs.

Float Control Valves

Angle or Globe types, Integral Pilot, Remote Pilot, Base Pilot or Balanced Float patterns. Sizes from 3" to 36" for 150 to 400 lb. working pressures.

Electric and Manual Water Service Valves

Solenoid operated, available in Angle and Globe Patterns. Sizes from 3" to 36" for 150 to 400 lb. working pressures.

These valves are regularly furnished in special heavy cast iron, semi-steel and cast steel, with bronze, Gallavoy or stainless steel trim, depending on service and pressure conditions. For more detailed descriptions of G-A's complete line of special water-service valves, write for your copy of our latest catalog.

GOLDEN-ANDERSON VALVE SPECIALTY CO.

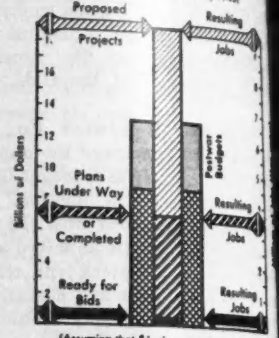
FULTON BLDG. • PITTSBURGH, PA.

POSTWAR PROJECT

POSTWAR ENGINEERING CONSTRUCTION VOLUME
PROPOSED, PLANS UNDERWAY OR COMPLETE AND READY FOR BIDS

*Status of postwar planning reported is this compared with annual postwar construction budget based on assumed National Income of $150,000,000,000 per year.

(Jan. 1, 1943 to Feb. 15, 1945)



(Assuming that $1 of construction volume produces 1 man-hour of labor, ⅓ on site)

Projects proposed for postwar construction [illegible] been published in these columns since Jan[illegible] 1943, as they have been reported to Engineering News-Record.

Statistics based on these reports are used by the Committee on Postwar Construction of the American Society of Civil Engineers to measure the progress of plans for postwar projects.

The chart above shows, both in estimated dollar volume, and in jobs or man-years of labor, how fast this reservoir of future work is filling.

If you or your community are working on projects that have not yet been included in the "postwar reservoir," please send us an item[illegible] list and description of them, including estimated cost and the names of the engineers who are at work on the plans. Then as you watch the arrows climb you will know that you and your community are contributing to the success of [illegible] NUMBER ONE JOB of preparing for peace.

Address your projects list to Manager Business News Department, Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.

MINIMUM SIZE OF PROJECTS PUBLISHED

Public Works	$25,000
Industrial Buildings	40,000
All Other Buildings	150,000

WATER SUPPLY

PROPOSED WORK

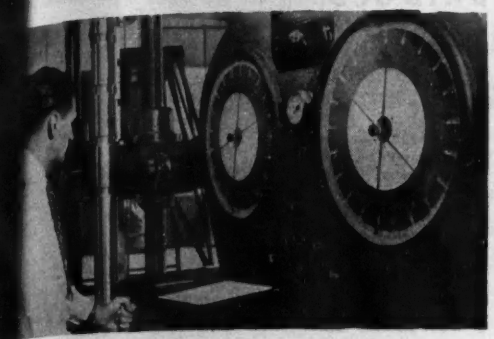
Calif., Colusa—City, City Hall, W[illegible] imprvs., exten. mains, etc. **$15,000.**

Calif., Roseville—City, City Hall, reva[illegible] ing reservoir. **$135,000.**

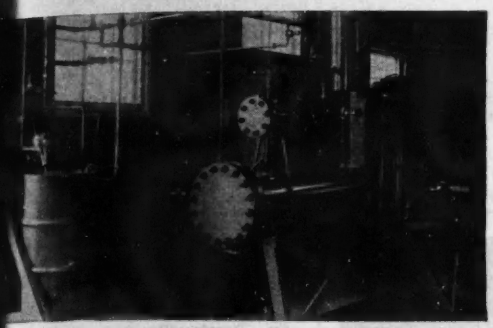
★**Calif., San Francisco**—City and San Fra[illegible] cisco Co., City Hall, first postwar p[illegible] Proj. 302 Sutro Reservoir excav., etc. $[illegible] 000; Proj. 303, pipe line in tunnel, [illegible] Andreas Outlet 3 **$62,000**; Proj. 305, [illegible] connections to 44 in. pipe **$81,000**; Proj. [illegible] same connection to No. 2, **$110,000**; Pr[illegible] 306, exten. Calaveras pipe through Alam[illegible] Tunnel **$325,000**; Proj. 307, Sunset Sup[illegible] Pipeline **$2,110,000**; Proj. 308, enlarge Cr[illegible] tal Springs, San Andreas canal **$250,[illegible]** Proj. 309, increase capacity Crystal Spr[illegible] pump. station **$105,000**, Proj. 310, sump[illegible] Sutro Reservoir **$414,000**, Proj. 311, norm[illegible] exten. small mains, etc. **$586,000**, Proj. [illegible] secdy. mains, w/valve, conn. **$650,000**, Pr[illegible] 312, corporation yard **$150,000**, Proj. [illegible] Balboa Reservoir, 1st unit, **$800,000**; [illegible] following years Proj. 301, Lake Merc[illegible] Pump. plant **$1,249,000**, Proj. 310, compl[illegible] Sutro Reservoir **$1,063,000**, Proj. 311, norm[illegible] exten. small mains, etc. **$1,514,000**; Pr[illegible] 315, complete 3 cross-conn. on Bay Cross[illegible] Pipes **$73,000**, Proj. 316, 2 addnl. units [illegible] Calaveras Reservoir **$50,000**, Proj. 317, [illegible] ft. elev. west of Twin Peaks Reservoir **$[illegible]** 000, Proj. 318, lime treatment plants, [illegible] 500, Proj. 319, Sunset Res., South Ba[illegible] **$1,000,000**, Proj. 321, Irvington Pump. St[illegible] tion **$59,000**; Proj. 322, replace trestle be[illegible] on Niles-Irvington Pipe, **$50,000**, Proj. [illegible] By-pass Guadalupe Tres., Crystal Spri[illegible] Pipeline **$140,000**, Proj. 326, filtration plan[illegible] Crystal Springs and San Andreas Reser[illegible] voirs, **$3,000,000**, Proj. 325, replace Rem[illegible] Peninsula Sys. **$270,000**, Proj. 327, roof a[illegible] reline original basin at University Mou[illegible] Reservoir **$500,000**, Proj. 328, rein.-con. re[illegible] for Francisco St. Reservoir **$50,000**, Pro[illegible] 329, rein.-con. roof for Lombard St. pu[illegible]

Ready to Serve You...

TECO Wood Products Development Shop and TECO Wood Chemistry Laboratory



000 lb. Baldwin-Southwark Hydraulic Testing Machine for ion compression and bending tests on wood.



toclave for Pressure Treating Woods with chemicals and pre-rvatives, Automatic Mixer at left.

Director of Research and Chief Chemist discuss wood chemistry problem in Teco Chemistry Lab.

More than 200 government officials, engineers, architects, building officials and representatives of the lumber industry attended the formal opening of Timber Engineering Company's Wood Products Development Shop and Wood Chemistry Laboratory at Washington, D. C.

The Wood Products Development Shop has a 200,000 lb. Baldwin-Southwark testing machine; a testing rig equipped to handle trusses up to 50′ span; autoclaves and other equipment used in pressure treating; dry kiln and high pressure steam equipment for impregnating; and other facilities for determining the physical and mechanical properties of wood and wood products.

The Wood Chemical Laboratory has modern equipment for investigations in wood chemistry and wood derivatives research. It is giving special attention to lignin research including adhesives, synthetic plastics, etc.

If you have any problems in respect to the physical, mechanical and chemical properties of wood, the technical staff of the Timber Engineering Company may be of assistance on a moderate fee basis. If its own facilities will not solve your problem, it will assist you in locating sources which can.

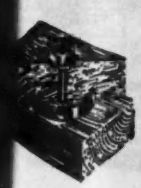
Consultations at our Washington office may be made by appointment and without obligation on your part. Write us on your business letterhead stating your wood utilization problem.

Watch for announcement of our ne book, THE FOREST INDUSTRIES BLAZE NEW TRAILS.

● Teco chemist working on chemical derivatives of wood.

TIMBER ENGINEERING COMPANY OF WASHINGTON, D. C.

WASHINGTON ▼ CHICAGO • NEW ORLEANS • SAN FRANCISCO



Specify **TECO**

CONNECTORS AND TOOLS

Endorsed by Leading Lumber Manufacturers and Fabricators

FOREIGN DISTRIBUTORS:

V. H. McIntyre, Ltd., Toronto, Canada • MacAndrews & Forbes, Ltd., London, England • Timber Engineering Company, Sydney, Australia Murie & Company, Ltd., Wellington, New Zealand • The Ford Company, Inc., Panama City, Panama • Standard Machinery & Supply Company, Mexico, D. F.

CEMENT GUN COMPANY

"GUNITE" CONTRACTORS

GENERAL OFFICES—ALLENTOWN, PENNA., U.S.A.

RAILROAD BRIDGES REPAIRED WITH "GUNITE"

To the left are three of many B. & O. Railroad bridges which we repaired with "GUNITE" last year. The original concrete was seriously disintegrated in the abutments, wing walls and back walls. The deteriorated concrete was all chipped away, the surfaces sandblasted and mesh reinforced "GUNITE" placed 2" to 12" in thickness to restore the structures to original dimensions. On the upper two bridges shown the track was shored up and entire new back walls built of "GUNITE".

Other "GUNITE" work which we completed last year for several railroads included tunnel lining, coaling station repairs, roundhouse roof repairs and train shed repairs.

Our 74-page bulletin 2200 describes scores of profitable uses of "GUNITE". Write for your copy.

MANUFACTURERS OF THE "CEMENT GUN"

"Interior Decorating" ISN'T OVERLOOKED, EITHER, IN BUILDING

WISCONSIN Air-Cooled ENGINES

The interior of every Wisconsin Engine casting is sprayed with red sealer. This adds nothing to the "beauty" of the engine but it IS an important service and maintenance precaution — because it forever seals any loose particles from entering the oiling system and causing trouble. Small details such as this are important in safeguarding the engine user against equipment layups and expense which could otherwise result. You get dependable, heavy-duty serviceability when a Wisconsin Engine is on the job.

Most H.P. per pound

WISCONSIN MOTOR Corporation

MILWAUKEE 14, WISCONSIN, U. S. A.

World's Largest Builders of Heavy-Duty Air-Cooled Engines

POSTWAR PROJECTS (Cont'd.)

voir **$50,000**, Proj. 329, roof and relin... lege Hill Reservoir **$250,000**, Proj. 32... construct, enlarge and roof, Lake H... Reservoir **$500,000**, Proj. 332, Ille P... Pool **$10,000**, for Water Dpt., 425 Mass... CD 3/22/43—ENR 3/25/43; Proj. 1429, ... en Gate Park, Strawberry Hill Reser... **$100,000**, Proj. 1415, Golden Gate P... water supply sys. **$125,000**, Proj. 1417 ... survey, water supply sys. **$25,000** for p... Proj. 1418, Golden Gate Park water s... sys. **$25,000** for plans, for Park Dpt. ...

Conn., Hartford—State Hy. Dpt., ... Office Bldg., 40,000 gal. water basins w... needed to fight forest fires. **$30,000**, P... cing not provided.

Md., Annapolis — Sanitary Comn., A... Arundel Co., Annapolis, water supply ... ment, A.A.S.-9, Eastport area, **$75,** ... water sys., A.A.S.-8, Severna Park, **$8,** ... Financing not provided.

Md., Frostburg—Municipality, water s... sit pipeline, 1-C1, **$16,000**; Water Loop ... Sect. 1, 1-C2, **$17,600**; Sect. 2, 1-C3, **$11,** ... Water Loop B, Sect. 1, 1-C6, **$17,700**; S... 2, 1-C7, **$14,900**; Sect. 3, 1-C8, **$10,** ... Financing not provided.

Md., Hagerstown—Municipality, reser... 21-D-26, **$65,000**; installing larger wa... main, **$6,000**. Financing not provided.

Md., Towson—Baltimore Co., Tow... elevated tank, Randallstown, 3-8, **$12,** ... watermains, Washington Blvd., 3-16, **$2,** ... Inverness, 3-17, **$35,000**; Fort Howard, 1... **$75,000**. Financing not provided.

Wis., Madison—City, J. R. Law, ma... City Hall, installing 60,000 ft. waterma... **$216,000**; service bldg., **$85,000**; 2 m.g. ... ervoir, **$90,000**. Financing not provi... CD 10/20/43—ENR 10/28/43.

Man., Portage La Prairie—City, water ... exten. About **$30,000**.

Ont., London—London Public Util... Comn., E. V. Buchanan, genl. mgr., w... heater controls, **$50,000**; water soft... equip. **$300,000**.

Que., Ste. Felicite Ouest—Municipality, ... Mayor E. Desgardins, WW sys. **$50,000**.

PLANS UNDER WAY

Calif., Eureka—City, City Hall, wa... sys. with treatment plant, storage reserv... **$265,000**. G. S. Winzler, City Hall, ... engr. CD 9/8—ENR 9/21.

Fla., Lake Worth—City, City Hall, pl... 20% completed new water filtration pla... **$226,000**; exten., water distr. sys., **$164,** ... Bids within 60 days on clarifier, flocula... chemical feed equip. Burns & McDon... Engrg. Co., 107 W. Linwood Blvd., Kan... City, Mo., consult. engr.

★**Fla., Sarasota**—City, City Hall, pl... under study, imprv. sewerage sys. ... sewage disposal plant. Approx. **$1,500,** ... Axon & Dodd, Daytona Beach, consult. en... CD 1/21/44—ENR 2/10/44.

Ga., Douglasville—City, c/o E. M. Hag... mayor, City Hall, plans under way wa... sys., facilities. **$60,000**. Wiedmann ... Singleton, Candler Bldg., Atlanta, G... consult. engrs.

★**Kan., Coffeyville**—City, City Hall, pl... under way modernizing treatment pla... new pump. plant, repair reservoir, imp... distr. sys. **$740,000**. Black & Veatch, 4... Bway., Kansas City, Mo., consult. en... J. G. Duckworth, Coffeyville, engr.

Md., Annapolis—Sanitary Comn., An... Arundel Co., plans under way water sys. ... Severna Park, A.S.-4, **$35,000**; Round B... A.S.-5, **$40,000**; watermain in Eastport, A... 8, **$23,000**. Financing not provided. W... Munroe, Green St., ch. engr.

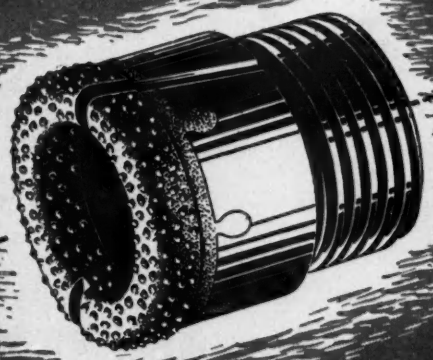
★**Md., Baltimore**—City, Bureau of Wat... Supply, plans under way Liberty D... and intake, B.C. 154, **$3,307,000**; water t... nel, Liberty Dam to city line, B.C. 1... **$5,324,000**; water supply mains Alame... Ave., B.C. 40, **$535,000**; Ensor St., B.C. ... **$144,000**; Druid Lake connections, impr... B.C. 43, **$95,000**; Towson Reservoir impr... B.C. 44, **$27,000**; master chlorinator, Mon... bello Station, B.C. 45, **$143,000**; distr. sy... imprvs., B.C. 46, **$1,015,000**. Financi... available. L. Small, water engr. N. ... Smith, ch. engr. CD 1/12—ENR 1/25.

Md., Hagerstown—City, City Hall, plan... 50% completed replacing watermains, e... **$75,000**. C. W. Stumpp, City Hall, ch... engr.

★**Md., Hagerstown**—Washington Co. San... tary Comn., Hagerstown, plans und... way waterline, Wheaton to Glenmont, W.S. ... 1, **$160,407**; Massachusetts Ave., S.S. ... **$38,250**; reservoir Hill Rd., W.S.-5, **$250,** ... White House Heights waterline, W.S. ... **$120,880**; Carmody Rd., W.S.-7, **$12,** ... waterline Hill Rd., W.S. 8, **$43,870**; Sarato... Ave., W.S. 9, **$21,750**; Luttrell Ave., W.S. ... 110, **$13,915**; Chestnut Ridge, W.S. 11, **$3,** ... **000**; Long Branch, W.S. 12, **$6,675**; North... east Branch, W.S. 13, **$249,960**; Northeas... Branch, W.S. 14, **$180,000**; water pump... station, Metzorett Rd., W.S. 20, **$15,** ... Calvert Ave., W.S. 21, **$13,340**; Chewto... Ave., W.S. 22, **$9,275**; Brentwood, W.S. 1... **$42,170**; Old Georgetown Rd., W.S. 25, **$27,** ... **840**; waterline and standpipe, connection... Riverdale Hills, W.S. 23, **$207,420**; pump. st... tion, W.S. 27, **$20,000**.

DIAMOND DRILLING IMPROVED

...with these LONGER-LASTING COST-REDUCING core bits



Whether you use diamond drilling for testing bed rock locations, rock strata thicknesses . . . drilling of grout holes for reinforcing dams and foundations . . . taking test cores before planning buildings . . . there's a J. K. S. HARDHED or HI-CASTE Core Bit to improve your operations and reduce their cost.

Set with diamonds carefully selected for sharp cutting edges and uniformity of size, these bits offer you the longer service life for which J. K. Smit products are known. As for operating costs, a comparative test made by a drilling company with several different diamond bits showed that HARDHED, for example, produced a minimum saving of 36% over other core bits tested.

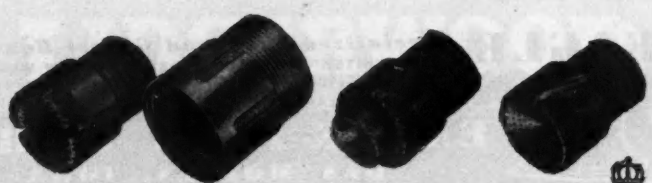
Two types of metal matrices have been developed by J. K. Smit engineers to meet the needs of different earth and rock formations.

● Use HARDHED bits for drilling in irregular, broken or coarse grained formations. Diamonds are set in a tough powdered metal matrix that is free cutting and gives a faster drilling speed than is normally found.

● Use HI-CASTE bits for drilling in hard, fine grained, solid ground. Diamonds are cast in a "Vankolite" matrix which is relatively hard and abrasion resistant. This material wears away gradually, keeping the bit sharp and free-cutting.

J. K. SMIT & SONS, Inc.

157 Chambers St., New York 7, N.Y. 6400 Tireman Ave., Detroit 4, Mich.



HI-CASTE DIAMOND CORE BITS • CASING BITS • CONCAVE BITS • PILOT BITS • REAMING SHELLS HARDHED

5 Advantages to Dredging with Eagle "Swintek" Ladders

1. Cutter chain screens nozzle—reduces clogging.
2. Maximum agitation close to nozzle increases ratio of solids taken in.
3. Cutters and nozzle operate efficiently at any ladder angle—maximum working depth assured.
4. Permits dredging in harder strata.
5. Carries oversize rocks away from suction zone.

There's safety in numbers and the number of Eagle "Swintek" Ladders in use speaks for itself. Users report up to 400% increased production from their dredges and as little as six hours per year lost time due to clogging. They can readily be fitted to any dredge. Sizes and lengths for any operating condition. Let our engineers make recommendations for the conversion of your dredge or let us work with your dredge-builder on your postwar re-equipment. Send for copy of "Dredging With Eagle 'Swinteks'."

•

EAGLE IRON WORKS
142 Holcomb Ave.
Des Moines, Ia.

Eagle Screw Washers, Log Washers, Dehydrators, Classifiers

30 to 180 tons per hour capacity. Soundly designed modern drives. Features that insure cleaner sand and maximum production. Send for Bulletin 44.

EAGLE *Specialized Sand and Gravel Equipment*
"SWINTEK" DREDGE LADDERS — SCREW WASHERS
LOG WASHERS — DEHYDRATORS — SAND TANKS
CLASSIFIERS — REVOLVING SCREENS

EAGLE IRON WORKS
DES MOINES, IOWA
"SERVING INDUSTRY FOR OVER SEVENTY YEARS"

POSTWAR PROJECTS (Cont'd.)

Mass., Rockdale and **Cherry Valley**—To... of Rockdale and Cherry Valley, c/o E. ... Titcomb, water comrs., Pleasant St., Le... ter, plans and specifications almost co... pleted water filtration plant. $50,000. ... nancing not provided. Metcalf & Eddy, ... Statler Bldg., Boston, consult. engrs.

★ **Mich., Saginaw-Midland**—Saginaw ... Midland City Waterworks Dpt., Saginaw ... Whitestone Point water supply from La... Huron, about $8,000,000. Alvord, Burdick ... Howson, 20 N. Wacker Dr., Chicago, ... consult engrs. CD 10/2—ENR 10/19.

Mo., Bismarck—City, City Hall, WW ... $70,000. Russell & Axon, 4903 Delmar Blvd., St. Louis, Zone 8, consult. engrs.

Mo., Kennett—City, City Hall, preliminary plans WW plant complete with equip., wate... mains, etc. $82,000. Russell & Axon, 49... Delmar Blvd., St. Louis, Zone 8, consult engrs.

Mo., Neosho—City, R. E. Peart, mgr., C... Hall, WW imprvs. $30,000. Burns & M... Donnell, 107 W. Linwood Blvd., Kans... City, Mo., consult. engrs.

Mo., Shelbina—City, City Hall, impr... water filtration plant. $25,000. Financi... not provided. Burns & McDonnell Engr... Co., 107 W. Linwood Blvd., Kansas C... Mo., consult. engr.

Mo., Steele—City, City Hall, preliminary studies WW imprvs., sewer extens., city ha... widening Main St. $75,000. Russell & Axo... 4903 Delmar Blvd., St. Louis, Zone 8, consult engrs.

Mont., Black Eagle—City, City Hall, pr... liminary plans under way water sys. $50,0... Financing not provided. Corwin & Co., Medi... cal Arts Bldg., Great Falls, consult. engrs.

Mont., Cut Bank—City, City Hall, preli... inary surveys under way water sys. a... power plant addns. $60,000. Financing n... provided. Corwin & Co., Medical Arts Bldg... Great Falls, consult. engrs.

New York—Dpt. P. Wks., State Off... Bldg., Albany, Zone 1, plans under way r... habilitation water supply in Allegany St... Park, Cattaraugus Co. for Dpt. Conservation... Bway, Arcade Bldg., Albany, Zone 7. $17,0...

N. Y., Cohoes—City, City Hall, plans un... der way imprv. reservoir. $150,000. Stat... Aid Planning Funds allotted.

N. C., Forest City—Town, Town Hall, ... plans 90% completed c.i. pipe, concrete and ... brick raw water supply and filter plant ... $270,000. Financing not provided. The Hat... wood Beebe Co., Spartanburg, S. C., con... sult. engrs.

N. D., Mandan—City, City Hall, wate... filtration imprvs., $54,200; concrete storag... reservoir, $36,200; WW distr. extens., $6,... 375. Financing not provided. Burns & Mc... Donnell Engrg. Co., 107 W. Linwood Blvd., ... Kansas City, Mo., consult. engr.

O., Portsmouth—City, City Hall, plans ... 90% completed repairing reservoir, $76,000; ... constructing filtration plant, $375,000. ... Lefeber, Temple Bar Bldg., Cincinnati, con... sult. engr. J. F. Parkinson, city engr.

Ore., Corvallis—City, City Hall, plans ... under way resurfacing and oiling streets, ... $50,000. Financing available. V. L. Good... night, City Hall, city engr.

Ore., Klamath Falls—City, City Hall, plans ... 75% completed rotating lawn sprinkler sys. ... pump house supplying water from river to ... cemetery. $15,000. E. A. Thomas, City Hall, ... city engr.

Pa., East Stroudsburg—East Stroudsburg ... Boro, East Stroudsburg, water supply pipe... line from reservoir to town, $50,000. E. C. ... Hess, 33 N. 7 St., Stroudsburg, engr.

★ **R. I., Woonsocket**—City, P. Wks. Comm., ... City Hall, W. Baillargeon, comr., water ... supply sys. $500,000. Charles B. Maguire ... & Assoc., Turkshead Bldg., Providence, ... consult. engrs. CD 2/17/44—ENR 3/9/44.

S. D., Mitchell—City, City Hall, plans ... 50% completed installing several thousand ... feet 16- to 24-in. feeder mains; two 1 m.g. ... elevated steel tanks, enlarging water treating ... plant to 5 m.g.d. $400,000. Financing ... not provided. Chas. A. Trimmer, City Hall, ... city engr. CD 7/14—ENR 7/27.

Tenn., Jackson—City, City Hall, plans ... 25% completed exten. distr. sys., incl. addn. ... of one 1 m.g. standpipe and relocating one ... 1 m.g. standpipe, vitr. clay and c.i. mains, ... $432,000. Financing not provided. Hart, ... Freeland & Roberts, 3rd National Bank ... Bldg., Nashville, archts. A. C. Howell, ... Commercial Bldg., consult. engr. D. W. ... Allen, City Hall, city engr.

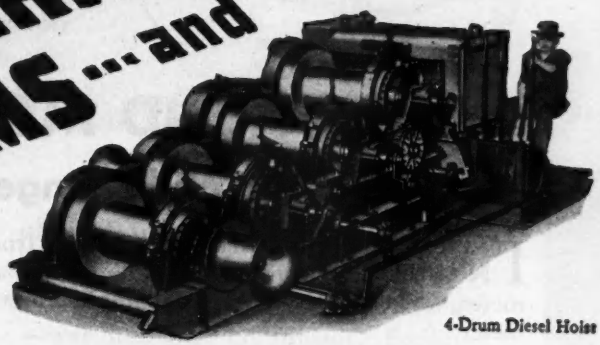
★ **Tex., Denton**—City, L. Preston, mayor, ... City Hall, making surveys water imprvs. ... $600,000. Financing not provided. J. E. ... Ward, Harvey-Snider Bldg., Wichita Falls, ... consult. engr.

Tex., Sweetwater—City, City Hall, plans ... 20% completed water treating plant addns., ... c.i. supply main, pump, plant addn. $47,000. ... V. O. Hoppe, engr.

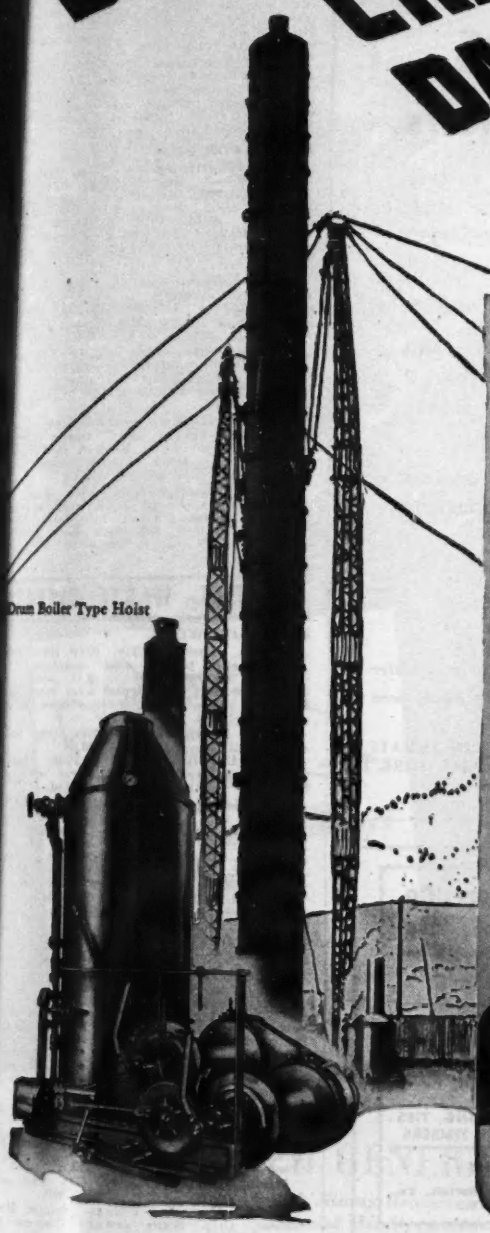
Vt., Rutland—City, City Hall, plans 10% ... completed storage reservoir and pipeline. ... $175,000. Financing not provided. W. F. ... Kallio, City Hall, city engr. CD 5/26—ENR ... 6/15.

Va., Charlottesville—City, Box 198, plans ... 75% completed 500 m.g. impounding reservoir supplementing city water supply. $400,000. E. W. Saunders, University of Virginia, ... consult. engr. S. Burnley, Box 198, city ... mgr. and engr.

BUILDING BRIDGES - VIADUCTS, CRACKING TOWERS, DAMS ... and



4-Drum Diesel Hoist



Drum Boiler Type Hoist

in every field of construction where ruggedness and downright reliability are demanded, Lidgerwood has never failed to keep faith with the man on the job.

Wherever the situation calls for hoisting, there is a LIDGERWOOD electric, steam, gasoline or Diesel powered hoist to do the job efficiently and dependably. For LIDGERWOOD hoists are *built right*—with a background of more than 71 years experience in building good hoists.

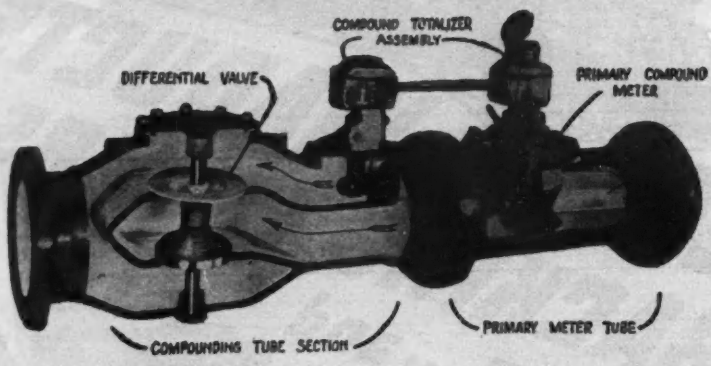
LIDGERWOOD

ESTABLISHED 1873

Manufacturing Company

MAIN OFFICE AND WORKS • ELIZABETH 8, NEW JERSEY

SPARLING MAIN-LINE METERS

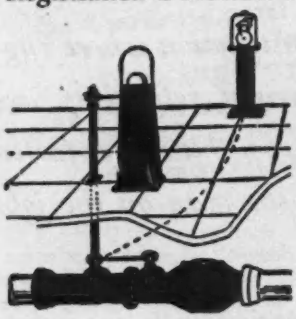


COMPOUND METERS

Accurate Over Wide Range of Flows

IN the cut-away view above, the flow is from right to left. Note the valve which begins to open, bypassing the small meter, when the flow reaches the minimum rate of the larger meter.

Registration is accurate over flow ranges as wide as 1 to 125.



There is no sharp cut-over point and the pressure loss, less than 2 pounds per square inch, is the lowest of any compound.

Indicators, Recorders and Controls are optional with all Sparling Meters.

Get the facts from

Bulletin 308

R. W. SPARLING

Manufacturer of water Measuring Equipment

LOS ANGELES 54...Box 3277 Terminal Annex
CHICAGO 16.....3104 South Michigan Ave.
622 Broadway .....CINCINNATI 2
101 Park Avenue .....NEW YORK 17
BOSTON 8 .....6 Beacon Street

BELMONT IRON WORKS

PHILADELPHIA ROYERSFORD EDDYSTONE

Fabricators *Contractors*

Exporters

STRUCTURAL STEEL
BUILDING & BRIDGES
RIVETED—ARC WELDED
BELMONT INTERLOCKING
CHANNEL FLOOR

Main Office Philadelphia, Pa.
44 Whitehall St. New York Office

EPPINGER AND RUSSELL CO.

Wood Preservers Since 1878

All kinds of Structural Timbers and Lumber Pressure Treated with Creosote Oil or

DU PONT CZC Chromated Zinc Chloride

80 EIGHTH AVE., NEW YORK, N. Y.

POLES, CROSS ARMS, PILING, TIES POSTS, BRIDGE and DOCK TIMBERS

TREATING PLANTS

Jacksonville, Fla. Norfolk, Va.
Long Island City, N. Y.

POSTWAR PROJECTS (Cont'd.)

Va., Lynchburg—City, City Hall, plans 50% completed extension, various parts of city, increasing fire protection. $193,500. Financing not provided. J. D. Wright, City Manager, and dir. Dpt. P. W.

W. Va., Fairmont—City, City Hall, and replacing water supply sys. S. A. Shuttleworth, City Hall, city engr.

Wis., Eau Claire—City, City Hall, completed water supply improvs., incl. pressure pump, station, supply line. Financing not provided. Greeley & 6 N. Michigan Ave., Chicago, Ill., engrs. A. R. Garnock, City Hall, city engr. CD 7/6—ENR 7/27.

Wis., Janesville—City, City Hall, 25% completed 23,945 lin. ft. 6- to c.i. watermains. $156,855. J. Lustig, Hall, city engr.

Wis., Janesville—City, City Hall, station, well. $30,000. J. Lustig, City city engr.

Wis., Madison—City, J. R. Law, City Hall, plans under way new unit $105,000. Financing not provided. Harrington, City Hall, city engr.

Wis., South Milwaukee—City, 2905 16 plans completed stand pipe, enlarge tion and chemical feed. $132,000. ing not provided. Consoer, Townsend Associates, 211 N. Wacker Dr., Chicago Ill., consult. engrs. O. McCann, City engr. CD 7/19—ENR 8/10.

Wis., Wauwatosa—City, 7616 Harwood Ave., plans 50% completed new well controls, pump, station, storage tanks conditioning present wells and pipeline $180,000. Land rights not cleared. M. Linnan, City Hall, engr.

READY FOR BIDS

★**Md., Baltimore**—City, City Hall, completed water pump, station, 38-A, $223,700; tunnel, B.C. 38-B, sedimentation works, B.C. 38-D, pipelines, B.C. 38D, $1,075,000; water supply, B.C. 38-E, $100,000; villa reservoir imprvs., B.C.-42, Financing available. CD 1/12—ENR 1/25.

Mich., Adrian—City, City Hall, plans completed water supply, complete plant, 5 daily capacity, $350,000-$400,000. Finkbeiner, Pettis & Strout, Home Bank Bldg., Toledo, O., engrs. CD 8/3—ENR 9/7.

★**Tex., Denton**—City, L. Preston, mayor, City Hall, making surveys water improvs., $600,000. Financing not provided. J. Ward, Harvey-Snider Bldg., Wichita Falls, consult. engr.

Tex., Mart—Town, plans completed water purification plant and imprvs. Financing provided. Koch & Fowler, Engrs., National Life Bldg., Dallas, consult. engrs. CD 4/20—ENR 5/4.

Va., Winchester—City, City Hall, plans completed watermains, water storage facilities. $125,000. Alexander Potter Associates, 50 Church St., New York 7, N. Y., consult. engrs. J. R. Brandon, Winchester city engr.

SEWERS, WASTE DISPOSAL

PROPOSED WORK

★**Calif., Fresno**—City, City Hall, sewage disposal plant and municipal farm imprvs., $850,000; Fruit Ave. sewer trunk line, $130,000; California Ave. storm sewer, $25,000; storm sewer main extens., $130,000. CD 9/8—ENR 9/21.

Calif., Pacific Grove—City, City Hall, sewage disposal sys. $35,000.

Me., Gardiner—City, Mayor, Hubbard, City Hall, sewerage disposal sys. Cost $50,000. Financing not provided.

Md., Annapolis — Sanitary Comm. Anne Arundel Co., Annapolis, sewerage sys., West Annapolis, A.A.S.-1, $20,449; Cedar Park, A.A.S.-2, $20,449; North Homewood, A.A.S.-3, $20,448; Wardour-West Annapolis, A.A.S.-10, $64,818; trunk sewer, Patapsco River, A.S. 6, $60,000; Sawmill Branch, A.S. 7, $47,000. Financing not provided.

Md., Frostburg — Municipality, sewerage collection and treatment plant, 1-C5, $135,500. Financing not provided.

★**Md., Gwynns Falls**—Municipality, sanitary sewer, 3-12. $1,000,000.

Md., Hagerstown — Municipality, storm drainage, May to Northern Sts., 21-D-7, $10,000; widening town drain, 21-D-9, $45,000; sewers Oak Hill Knolls, 21-D-12, $5,000; mi. new sewers, 21-D-20, $18,000; pumping sewage treatment tank, 21-D-22, $20,000; digester at Sewage Works, 21-D-23, $25,000; sludge beds, at Sewage Works, 21-D-24, $20,000. Financing not provided.

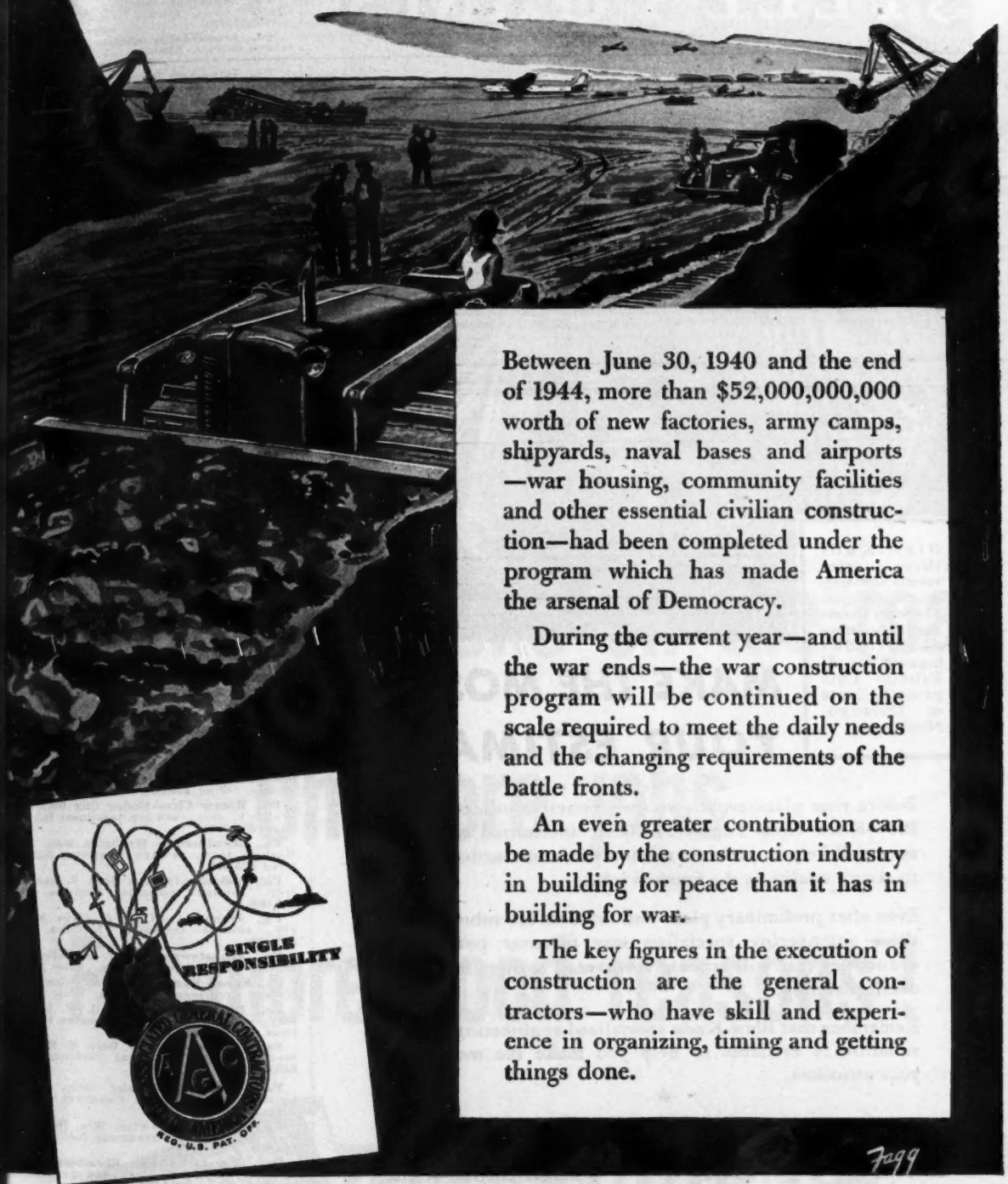
Md., Lochearn-Milford—City, sewer Dist. 3-15. $150,000.

Mass., Bourne—Town, Selectmen's Office, Town Hall, incinerator at Buzzards Bay. Over $40,000. Financing not provided.

Mich., Newberry—City, City Hall, sewage disposal plant. Approx. $160,000.

Minn., Mound — Village, Louise Huestis, mayor, City Hall, sewage disposal plant. Over $25,000.

They have moved mountains



Between June 30, 1940 and the end of 1944, more than $52,000,000,000 worth of new factories, army camps, shipyards, naval bases and airports —war housing, community facilities and other essential civilian construction—had been completed under the program which has made America the arsenal of Democracy.

During the current year—and until the war ends—the war construction program will be continued on the scale required to meet the daily needs and the changing requirements of the battle fronts.

An even greater contribution can be made by the construction industry in building for peace than it has in building for war.

The key figures in the execution of construction are the general contractors—who have skill and experience in organizing, timing and getting things done.

Fagg

THE ASSOCIATED GENERAL CONTRACTORS of AMERICA, Inc.

Ninety Branches and Chapters Throughout America
National Headquarters—Munsey Building, Washington 4, D. C.

SKILL, INTEGRITY AND RESPONSIBILITY IN THE CONSTRUCTION OF BUILDINGS, HIGHWAYS, RAILROADS AND PUBLIC WORKS

BLAW-KNOX STEEL FORMS

Blaw-Knox three-quarter round non-telescopic collapsible Steel Forms used in building 6 meter (19.6 ft.) tunnels for El Palmito Dam project, State of Durango, Mexico.

MAKE THE MOST OF YOUR ESTIMATES!

Before your plans are drawn on a concrete job, consult Blaw-Knox Form Engineers. Their specialized experience will help to promote economy in construction and to secure quality in the finished job.

Even after preliminary plans and estimate are submitted, these engineering specialists may discover potential economies that will account for overall savings in final detail planning.

Remember that Blaw-Knox specialized engineering consultation is available to help you make the most of your estimates.

★

BLAW-KNOX STEEL FORMS are used for construction of

TUNNELS WALLS SEWERS DAMS BRIDGES PIERS
CONDUITS ROADS SEWAGE DISPOSAL PLANTS

and other varieties of concrete construction

BLAW-KNOX DIVISION of Blaw-Knox Co.
2001 FARMERS BANK BUILDING • PITTSBURGH, PA.
New York • Chicago • Philadelphia • Birmingham • Washington

POSTWAR PROJECTS (Cont'd.)

Mo., Clayton (St. Louis Zone 5, P. O.)—City, C. H. Kerth, mgr., 10 North Bemiston St., $250,000 bond election Apr. 3, extensions, improvements, sewers, $85,000; funds, garbage disposal plant.

★**Nev., Reno** — City, City Hall, storm drains, $300,000; construction all ditches with rein.-con. culverts, $350,000.

Pa., Aliquippa—Aliquippa Boro, E. W. Devitt, secy., sewage treatment facilities. Over $25,000.

Pa., Arnold—City, City Hall, sanitary and storm sewers, $100,000; financing not provided.

Pa., Avis—Avis Boro, T. A. Brickley, secy., sewage treatment facilities. Over $25,000.

Pa., Baden—Baden Boro, W. R. Rea, secy., sewage treatment facilities. Over $25,000.

Pa., Beaver—Beaver Boro, J. W. Baker, secy., sewage treatment facilities. Over $25,000.

Pa., Birdsboro — Birdsboro Boro, R. E. Power, works mgr., sewage treatment facilities. Over $25,000.

Pa., Bradford—City, M. E. Cornelius, clk., sewage treatment facilities. Over $25,000.

Pa., Bristol—Bristol Boro, W. J. Lefferis, secy., sewage treatment facilities. Over $25,000.

Pa., Brownstown—Brownstown Boro, Wm. G. Schlashauer, secy., sewage treatment facilities. Over $25,000.

Pa., Conemaugh—East Conemaugh Boro, Mary A. Motter, secy., sewage treatment facilities, in East Conemaugh. Over $25,000.

Pa., Derry—Derry Boro, C. E. Kuntz, secy., sewage treatment facilities. Over $25,000.

Pa., Downingtown—City, E. B. Sagner, secy., sewage treatment facilities. Over $25,000.

Pa., East Brady—East Brady Boro, Valaria L. Verner, secy., sewage treatment facilities. Over $25,000.

Pa., Easton—City, C. E. Rogers, city clk., sewage treatment facilities. Over $25,000.

Pa., Eldred — Eldred Boro, M. Scarcell, secy., sewage treatment facilities. Over $25,000.

Pa., Everson—Everson Boro, G. Farrah, secy., sewage treatment facilities. Over $25,000.

Pa., Ferndale—Ferndale Boro, E. D. Snyder, secy., sewage treatment facilities. Over $25,000.

Pa., Ford City—Ford City Boro, T. D. Cowdrey, secy., sewage treatment facilities. Over $25,000.

Pa., Foxburg—Foxburg Boro, C. A. Miller, secy., sewage treatment facilities. Over $25,000.

Pa., Franklin—Franklin Boro, F. Singel, secy., sewage treatment facilities. Over $25,000.

Pa., Freedom — Freedom Boro, J. Roy Snead, secy., sewage treatment facilities. Over $25,000.

Pa., Freeport—Freeport Boro, M. Kiskadden, secy., sewage treatment facilities. Over $25,000.

Pa., Harmony — Harmony Boro, C. A. Scheidemantel, secy., sewage treatment facilities. Over $25,000.

Pa., Homer City—Homer City Boro, R. E. Walbeck, secy., sewage treatment facilities. Over $25,000.

Pa., Hyndman — Hyndman Boro, A. C. Horner, secy., sewage treatment facilities. Over $25,000.

Pa., Indiana—Indiana Boro, R. Moorhead, secy., sewage treatment facilities. Over $25,000.

Pa., Jeannette — City, J. Claire Manson, clk., sewage treatment facilities. Over $25,000.

Pa., Johnstown—City, J. J. Cullen, clk., sewage treatment facilities. Over $25,000.

Pa., Kane—Kane Boro, T. M. Paisley, secy., sewage treatment facilities. Over $25,000.

Pa., Kittanning — City, G. W. L. Starr, secy., sanitary sewage treatment facilities. Over $25,000.

Pa., Latrobe—Latrobe Boro, E. M. Eaton, secy., sewage treatment facilities. Over $25,000.

Pa., Ligonier—Ligonier Boro, c/o A. Hoover, secy., sewage treatment facilities. Over $25,000.

Pa., Lock Haven—City, Wm. Hollis, clk., City Hall, sewage treatment facilities. Over $25,000.

Pa., Lorain (mail Ebensburg)—Lorain Boro, K. A. Marsh, secy., sewage treatment facilities. Over $25,000.

Pa., Meyersdale—Meyersdale Boro, W. A. Shoemaker, secy., sewage treatment facilities. Over $25,000.

Pa., Midland—Midland Boro, C. K. O'Hara, secy., sewage treatment plant. Over $25,000.

Pa., Monaca—Monaca Boro, G. Grater, secy., sewer treatment plant. Over $25,000.

Pa., Mount Jewett—Mount Jewett Boro, G. L. Douglass, secy., sewage treatment facilities. Over $25,000.

More Ford trucks on the road

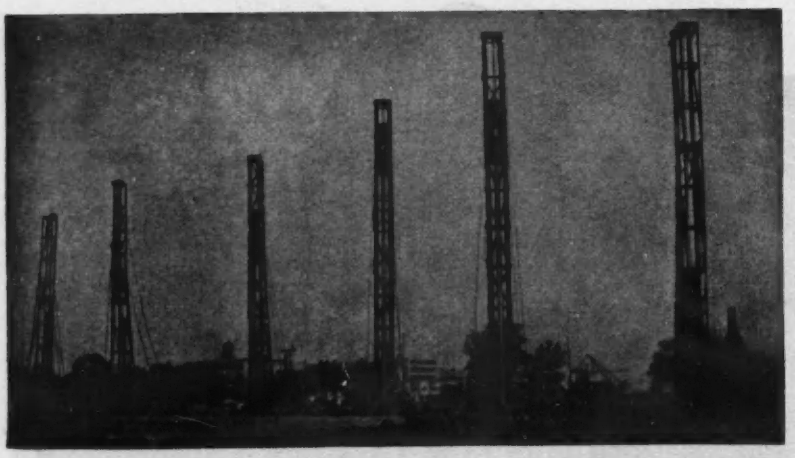
On more jobs

For more good reasons!

TRUCK-ENGINEERED

FORD TRUCKS
AND COMMERCIAL CARS

TRUCK-ENGINEERED AND TRUCK-BUILT BY TRUCK MEN



WESTERN

WESTERN FOUNDATION CO. DRILLED-IN CAISSON CORP.
WESTERN CONCRETE PILE CORP.
308 W. WASHINGTON ST., CHICAGO 6, ILL. 155 EAST 42ND ST., NEW YORK 17, N. Y.
MONADNOCK BLDG., SAN FRANCISCO 5, CALIF.

IRVING GRATING

FLOORING AND STAIR TREADS

"A Fitting Grating for Every Purpose"

Riveted
Walkways — Stair Steps — Platforms
Trucking Aisles — Trench Covers

Press-Locked
Industrial Plants — Oil Refineries
Chemical Plants — Power Houses
Naval and Merchant Ships
Locomotive, Passenger and Freight Cars

Welded
Catalog for the asking.

IRVING SUBWAY GRATING CO., INC.
ESTABLISHED 1902
HOME OFFICE AND PLANT: 5008 27th STREET
LONG ISLAND CITY, N.Y.
BRANCH OFFICE & PLANT: 2001 PARK AVE.
RIVERSIDE, CALIFORNIA

"GUNITE"

New Construction—Repairs

Prestressed Tanks	Steel Encasements
Reservoir Lining	Dam Repairs
Pen Stock Lining	Tunnel Lining
Smoke Stack Lining	Sewer Repairs

Disintegrated Concrete Abutments Renewed
Repairs To All Types of Masonry
Write for our Bulletins

PRESSURE CONCRETE CO.
Engineers & Gunite Contractors
121 Nat. Bank Bldg. FLORENCE, ALA.
6 Avenue B NEWARK, N. J.

Hayward Buckets

Use this Class "EY" Clam Shell Bucket for handling crushed stone, gravel, sand and other bulk materials.
THE HAYWARD CO., 40-50 Church St., N. Y.

POSTWAR PROJECTS (Cont'd.)

Pa., Mount Pleasant—Mount Pleasant Boro, F. L. Overly, engr. sewage treatment facilities. Over $25,000.

★**Tenn., Knoxville**—City, City Hall Park sanitary sewer extens., $915,000; First Creek channel (incl. property to be purchased), $2,000,000; Second Creek channel, $513,000; interceptor sewers to disposal plant, $2,475,000; 3 sewage treatment plants, $1,... $12,500; incinerator, $...,000.

Tex., Baytown—Harris Co. Water Control & Imprvt. Dist. 7, Baytown, sewage disposal plant, $60,000; drainage sys., $30,000. Financing not provided. CD 8/30—ENR 9/21.

★**Va., Newport News**—City Council, City Hall, plans sewer and sewage disposal plant, $1,788,820. Financing not provided.

★**Wis., Madison**—City, City Hall, expanding sewage treatment plant and connections, $1,300,000; 2 incinerators, $240,000; storm sewer in Blount St., $61,000. Financing not provided.

Man., Portage La Prairie—Municipality, sewage disposal plant, $15,000.

Ont., Huntsville—Town, H. E. Rice, mayor, City Hall, sewage disposal plant. $75,000. $40,000.

Ont., Swansea—Municipality, incinerator.

PLANS UNDER WAY

Calif., Oroville—City, City Hall, concrete storm sewers, $43,000; vitr. sanitary sewers, $7,000. Financing not provided. S. J. Norris, City Hall, city engr.

Calif., Palo Alto—City, City Hall, enlarging sewage treatment plant. $76,000. L. Harold Anderson, City Hall, city engr.

Calif., Redding—City, City Hall, modern sewage disposal sys. $150,000. G. Pearl, City Hall, city engr. CD 9/8—ENR 9/21.

★**Calif., Stockton**—City, City Hall, trunk line sewers, enlarging sewage disposal plants, $157,500; filling Mormon Channel and installing storm drain east of Center St., $375,000. L. Payton, City Hall, city engr.

Calif., Stockton—San Joaquin Co., Court House, installing storm water sewers in eastern suburbs of Stockton and at San Jaoquin Co. General Hospital, $80,077. J. B. Manthey, Court House, co. engr. CD 11/15/43—ENR 11/18/43.

★**Conn., Hamden**—Town, M. J. Whalen, clk., Town Hall, plans completed sanitary sewers, various locations, East Side Lake Whitney, etc. $500,000. Financing not provided. F. W. Whitney, Town Hall, engr. CD 5/9—ENR 5/18.

Fla., DeLand—City, City Hall, preliminary plans sanitary sewer extens., imprvs., and complete sewage treatment plant with connections, etc. $200,000. Russell & Axon, 4903 Delmar Blvd., St. Louis 8, Mo., consult. engrs.

Fla., New Smyrna—City, City Hall, preliminary studies under way sanitary sewer extens., imprvs. and sewage treatment plant complete with auxiliaries, accessories, connections. $150,000. Russell & Axon, 4903 Delmar Blvd., St. Louis 8, Mo., consult. engrs.

★**Fla., Sarasota**—City, City Hall, plans 75% completed imprv. water supply sys. $600,000. Smith & Gillespie, Rogers Bldg., Jacksonville, consult, engrs. CD 1/21/44—ENR 2/10/44.

Fla., Stuart—City, City Hall, preliminary plans sanitary sewerage sys. and sewage treatment plant. $160,000. Russell & Axon, 4903 Delmar Blvd., St. Louis 8, Mo., consult. engrs.

Ga., Toccoa—City, City Hall, plans 25% completed sewer outfall line, disposal plant, $55,000. Financing not provided. The Harwood Beebe Co., Spartanburg, S. C., consult. engr.

Ill., Griggsville—City, c/o Clerk, preliminary plans sewage treatment plant with auxiliaries, appurtenances and connections, etc. $40,000. Russell & Axon, 4903 Delmar Blvd., St. Louis 8, Mo., consult. engrs.

Ia., Albert City—City, C. G. Carlson, mayor, City Hall, sewerage sys. $50,000. Buell & Winter, 508 Insurance Exchange Bldg., Sioux City, consult, engrs.

La., Lafayette—City, C. C. Colcomb, mayor, City Hall, plans under way sewage disposal plant. $75,000. Financing not provided. J. B. McCrary Co., 22 Marietta St. Bldg., Atlanta, Ga., consult engrs.

★**La., New Orleans**—City, City, Hall, plans under way incinerator occupying 2½ blocks and disposing of 900 tons refuse daily. $1,250,000. Nichols Engineering & Research Corp., 60 Wall Tower, New York, N. Y., consult. engrs.

★**Md., Baltimore**—Bureau Sewers, Municipal Bldg., plans under way trunk sewers Vail St., B.C. 55, $700,000; Newgate St., B.C. 57, $405,000; storm water sewers Allendale St., B.C. 56, $105,000; Brooklyn Blvd. relief drain, B.C. 58, $175,000; sludge reduction tanks, sewage treatment, B.C. 61, $...,000; altering trickling filters, B.C. 62, $270,000; Jones Falls interceptor sewer, B.C. 63, $...,000,000; sanitary sewers Cross County Blvd., B.C. 64, $400,000. Financing available. N. L. Smith, City Hall, ch. engr. CD 1/12—ENR 1/25.

What makes this Upson-Walton Wood Block a Better Wood Block?

THE wood block is the earliest form of tackle pulley-block. Centuries old, made originally with rope straps, then with iron and finally with steel, it became a more efficient, sturdier hoisting tool as time progressed—until today, in Upson-Walton wood blocks, we have hoisting strength undreamed of by its early users.

UPSON-WALTON SHELLS ARE BEST QUALITY HARD WOOD specially chosen for strength. Wood is well seasoned, free from knots and hearts which would weaken it. This shell is unusually hard wearing and long lasting.

SHEAVES ARE MADE FROM CLOSE-GRAINED GREY IRON, hence they are stronger. Closely inspected to exclude all blow-holes, pits and other weakening inclusions.

SHEAVE RIM AND CENTER PIN ARE CONCENTRIC. Center pins are made of cold rolled steel. Unusual care is taken by Upson-Walton to insure true-running sheaves. Close tolerance between sheave bearing and center pin results in longer life for the bearing.

HEAVY STRAPS AND DROP FORGED CONNECTIONS of selected fine grain steel give Upson-Walton wood blocks greater strength and a higher safety factor.

HEAVIER DROP-FORGED HOIST HOOKS *. . . not the usual and weaker round stock type, but specially-designed, heavy-duty hoist type as used on cranes and heavy equipment. Permits greatly increased safe-working loads.* Majority of Upson-Walton wood blocks are now equipped with this type hook.

ALL UPSON-WALTON WOOD BLOCKS ARE FURNISHED COMPLETE WITH BECKET

AS WE GO TO PRESS, DELIVERIES ON ALL SIZES OF UPSON-WALTON WOOD BLOCKS ARE GOOD

Established 1871

THE UPSON-WALTON COMPANY

Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks

MAIN OFFICES AND FACTORY: CLEVELAND 13, OHIO

114 Broad Street, New York 4 — 737 West Jackson Boulevard, Chicago 6 — 241 Oliver Building, Pittsburgh 22

One Sure Way

TO COMBAT SICK ABSENTEEISM

- One of the chief causes of sick absenteeism is common colds, "flu" and such mouth-borne infections.
- A sure way to help combat the spread of such infections is the use of individual drinking cups.
- The Dixie Portable Water Carrier provides cool, clean drinking water in individual Dixie or Vortex Cups.
- Its use on the job lessens the risk of "passing on" mouth-borne disease germs.
- It helps reduce sick absenteeism.
- It cuts out trips to the water wagon.
- It cuts down time spent in "visiting" and otherwise wasted.
- It can help you step up schedules—beat contract dead-lines.

Write for descriptive folder giving complete information on this portable water service, including tanks, dispensers and cups. Dixie and Vortex Cups are made at Easton, Pa., Chicago, Ill., Darlington, S. C. and Toronto, Canada

DIXIE CUPS

DRINKING CUPS AND FOOD CONTAINERS

POSTWAR PROJECTS (Cont'd.)

Md., Hagerstown—Municipality, plans prepared completed storm drainage, Oak St. East, 21-D8, $25,000. Financing not provided. C. W. Stump, Sr., City Hall, city engr.

★**Md., Hagerstown**—Washington Co. Sanitary Comn., Hagerstown, plans under way sewer in North Englewood W.S.-3, $13,600; Landover Rd., W.S. 26, $17,100; Rock Creek to Garrett Park, W.S. 29, $150,000; Northwest Branch (Sligo), $267,000; trunk sewers at Beaver Dam, W.S. 4, $70,000; Beaver Dam, W.S. 15, $162,000; storm drainage Grape St. Branch, W.S. 18, $25,000; sewage treatment works, Brandenburg, $1,050,000; sewer interceptor, Potomac River, W.S. 28, $386,500.

★**Md., Towson**—Baltimore Co., Towson, sanitary sewers, Colgate Park, 2-1, $20,000; Tanglewood, 3-3, $67,000; Armagh Village 3-4, $40,000; sewers at Patapsco River, 3-5, $1,800,000; Broad-Cheese Creek, 3-9, $150,000; Patapsco River Neck, 2-12, $1,000,000; Lansdowne-Erdman Consul, 2-12, $300,000; St. Denis-Relay, 3-14, $397,500; storm water sewers, Mine Bank Lane, 3-51, $15,000; Parkville Summit, 3-52, $40,000; Linwood and Dubois, 3-52, $3,000; Frederick Park and Egges Lane, 3-55, $50,000; Nunnery Lane, 3-56, $100,000; plans completed sanitary sewers, Graceland Park, 3-3, $275,000; storm water sewer Pinehurst, 3-34, $25,000; Oak Forest Dr., 3-35, $16,000; Wagner Ave., 3-36, $10,000; Rosewood Ave., 3-37, $50,000; East Towson, 3-39, $15,000; Symington Ave., 3-40, $12,000; Idlewylde, 3-41, $25,000; Dundalk, 3-54, $25,000. Financing not provided. CD 2/26—ENR 2/10.

Mo., Affton (St. Louis, 23 P. O.)—Affton Sanitary Sewer Distr. 2, C. Kuna, secy., 9209 Niles Ave., Affton, St. Louis, Zone 23, preliminary plans completed exten. sanitary sewerage sys. in various parts of district, $120,000. Russell & Axon, 4903 Delmar Blvd., St. Louis, Zone 8, consult. engrs.

Mo., Belnor (St. Louis, Zone 21 P. O.)—Village Bd., preliminary plans exten. sanitary and storm water sewers. $100,000. Russell & Axon, 4903 Delmar Blvd., St. Louis, Zone 8, consult. engrs.

Mo., Bismarck—City, City Hall, completing sanitary sewerage sys. $67,000. Russell & Axon, 4903 Delmar Blvd., St. Louis, Zone 8, consult. engrs.

Mo., Canton—City, City Hall, storm and sanitary sewers, drainage facilities, $55,000. Russell & Axon, 4903 Delmar Blvd., St. Louis, Zone 8, consult. engrs.

Mo., Houston—City, City Hall, preliminary plans sanitary sewerage sys., sewage treatment plant. $115,000. Russell & Axon, 4903 Delmar Blvd., St. Louis, Zone 8, consult. engrs.

Mo., Kennett—City, City Hall, preliminary plans sanitary sewerage sys., $70,000; storm water drainage facilities, $54,000. Russell & Axon, 4903 Delmar Blvd., St. Louis, Zone 8, consult. engrs.

Mo., Lebanon — City, sewage treatment plant addn., exten. $80,000. Financing not provided. Burns & McDonnell Engrg. Co., 107 W. Linwood Blvd., Kansas City, Mo., consult. engr.

Mo., Richland—City, c/o City Clerk, City Hall, sewage treatment plant with auxiliary equip., appurtenances, accessories and connections to sewers, etc. $110,000. Russell & Axon, 4903 Delmar Blvd., St. Louis, Zone 8, consult. engrs.

Mo., Shelbina—City, City Hall, sewage treatment plant, $70,000. Financing not provided. Burns & McDonnell Engrg. Co., 107 W. Linwood Blvd., Kansas City, Mo., consult. engr.

Mo., Thayer—City, c/o Mayor, City Hall, sanitary sewerage sys. $65,000. Russell & Axon 4903 Delmar Blvd., St. Louis, Zone 8, consult. engrs.

Mont., Chester—City, City Hall, preliminary studies sewage disposal plant and sewerage sys. $25,000. Corwin & Co., Medical Arts Bldg., Great Falls, consult. engrs.

Mont., Chinook—City, City Hall, preliminary study sewage disposal plant, $70,000. Corwin & Co., Medical Arts Bldg., Great Falls, consult. engrs.

Mont., Cut Bank—City, City Hall, preliminary surveys under way sewage treatment plant. $100,000. Financing not provided. Corwin & Co., Medical Arts Bldg., Great Falls, consult. engrs. CD 1/31.

N. Y., Blasdell—Village, plans under way remodeling disposal plant. $60,000. State Aid Planning Funds allotted.

N. Y., LeRoy—Village Bd., LeRoy, sanitary sewerage sys. Wm. S. Lozier, Inc., 10 Gibbs St., Rochester, consult. engr. Contract awarded to Henry D. Cranston & Son, Fredonia, to make 100 or more test borings for project at $2.25 per ft.

N. Y., Massena—Village, plans under way intercepting trunk sewers, $148,760; incinerator, $35,000. State Aid Planning Funds allotted.

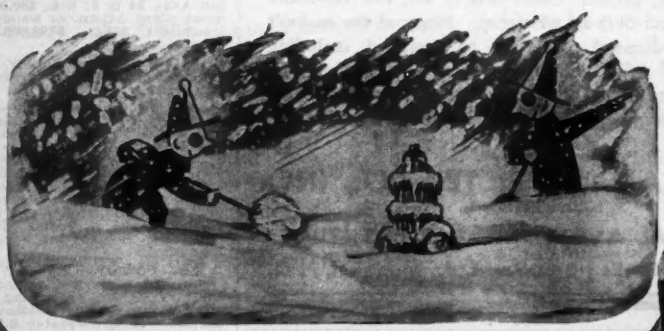
N. C., Marion—Town, Town Hall, plans 25% completed clay and c.i. sewer outfall line, disposal plant. $110,000. Financing not provided. The Harwood Beebe Co., Spartanburg, S. C., consult. engrs.

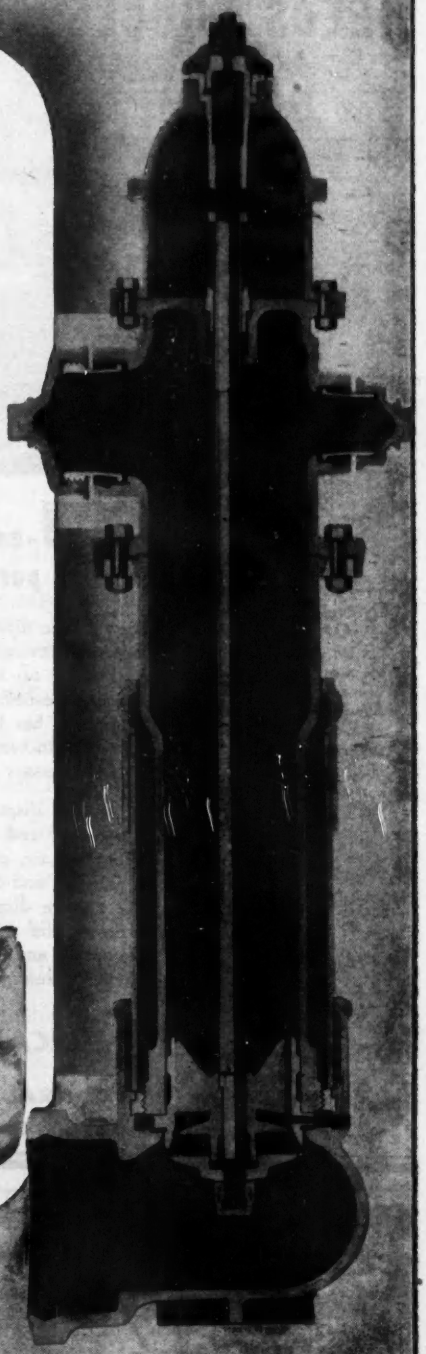
N. D., Mandan—City, City Hall, storm sewers, $222,000; refuse incinerator, $37,400; new sewage treatment plant, $221,135. Financing not provided. Burns & McDonnell Engrg. Co., 107 W. Linwood Blvd., Kansas City, Mo., consult. engr. CD 9/8—ENR 9/21.

CAN'T FREEZE-UP—OR DOWN!

The "innards" of a Mathews are as snug as a bug in a rug. A roof-like operating nut acts as a shield, preventing rain, sleet, snow, or hose spray from seeping in and freezing. A stuffing box keeps internal water away from the threads. An automatic drain-valve drains the hydrant dry after use.

These features are typical of the thought and care with which every detail in a Mathews Hydrant has been worked out to provide years of dependable, economical fire protection. If you are considering hydrants for your community, be sure to send for a detailed description of what Mathews Modernized Hydrants have to offer.





MATHEWS HYDRANTS

Made by R. D. WOOD *Company*

400 CHESTNUT STREET, PHILADELPHIA 5, PA.

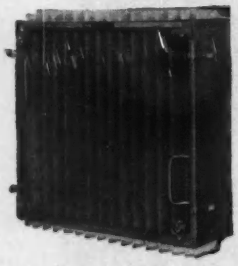
MANUFACTURERS OF SAND SPUN PIPE (CENTRIFUGALLY CAST IN SAND MOLDS) AND R. D. WOOD GATE VALVES

MODERN SEWAGE DISPOSAL NEEDS DOUBLE AIR FILTRATION!

AAF-engineered air cleaning keeps the fine pores of diffuser plates OPEN

1 Cross section of the AAF Multi-Duty showing automatic self-cleaning features. Acts as primary filter in double-filtration system. Removes all but the occasional fine particle of dust and soot.

The ceramic diffuser plates used in the activated sludge process of sewage treatment, to secure thorough aeration, quickly fill up if the air applied through them is only partially cleaned. That is why the economy of doubly-filtered air has been so fully demonstrated — it reduces costs and increases capacity by cutting down on shut-downs necessary when diffuser plates are replaced.



2 AAF Airmat Type PL Filters are used as secondary cleaners in double-filtration system.

In sewage disposal service, the combination of AAF Multi-Duty and Airmat filters can't be duplicated for volume of air, extreme cleanliness of air, low resistance to air flow and over-all efficiency. Many of the nation's best sewage disposal plants are so equipped, including those at Ann Arbor, Chicago, Columbus, Cleveland, Indianapolis and Madison. Complete data on all AAF filters for sewage disposal plants is available on request.

AMERICAN AIR FILTER CO., INC.
Incorporated
101 CENTRAL AVE., LOUISVILLE 8, KENTUCKY
In Canada: Darling Brothers, Ltd., Montreal, P. Q.

ERIE TRUCK MIXER PLANTS

Erie builds a complete line of central concrete plants to keep truck mixers on the move.

Consult Erie now for the most modern of Post-war Plants.

ERIE STEEL CONSTRUCTION CO · ERIE, PA.
Aggre Meters · Buckets · Concrete Plants · Traveling Cranes

POSTWAR PROJECTS (Cont'd.)

★**O., Portsmouth**—City, City Hall, sewage disposal plant $500,000, sewers $281,500. Financing not provided. J. F. Parkinson, Portsmouth, engr.

Okla., Shawnee—City, City Hall, plans completed sewage disposal plant, $200,000. Financing not provided. S. R. Holway, 321 E. 18 St., Tulsa, consult. engrs. T. E. Thomason, City Hall, engr. CD 9/28—ENR 10/19.

Ore., Corvallis—City, City Hall, plans under way interceptor sewer to collect surface flow of 5 mains, $100,000; plans incinerator, $15,000-$25,000. Financing available. V. V. Goodnight, City Hall, city engr. CD 6/13—ENR 7/13.

Ore., Milton—City, City Hall, plans under way sewers and sewage treatment plant. Over $25,000. Financing not provided. J. W. Cunningham & Associates, Spalding Bldg., Portland, consult. engrs.

Pa., Hazelton—City, City Hall, plans 60% completed fifteen 8- to 18-in. storm and sanitary sewer jobs, and combined sewer of 96 in. concrete pipe, $200,000. Financing not provided. P. Lamont, City Hall, city engr.

★**Pa., Phila.**—City, Dpt. P. Wks., City Hall, plans 80% completed Gunners Run relief sewer exten., Proj. WE 33, $215,000; Dyott St. relief sewer exten., Proj. WE 32, $707,000; main relief sewer north of Parkway to 16 and Tioga Sts., Proj. WE-31, $4,160,000. Financing not provided. Thos. Buckley, City Hall, city engr.

★**R. I., Woonsocket**—City, P. Wks. Comr. W. Baillargeon, comr., City Hall, sewerage, $500,000. Charles B. Maguire & Assoc., Turkshead Bldg., Providence, consult. engrs. CD 2/17/44—ENR 3/9/44.

Tex., Crane—City, plans 10% completed sanitary sewers. $60,000. Koch & Fowler, Great National Life Bldg., Dallas, consult. engrs. CD 12/28—ENR 1/4, under Sewers.

Tex., Denton—City, City Hall, making surveys sanitary and storm sewers and impvts., $450,000. Financing not provided. J. E. Ward, Harvey-Snider Bldg., Wichita Falls, consult. engr.

★**Tex., Laredo**—City, City Hall, storm sewers, $500,000; preliminary plans exten. interceptor and gathering lines of sanitary sewer, $75,000. Financing not provided. F. C. Heins, Box 562, city engr. CD 1/10—ENR 1/25.

Tex., Highland Park (mail Dallas)—Town, 4700 Drexel St., Highland Park, Dallas Zone 5, plans 75% completed rein.-con. storm sewers, $300,000. Rollins & Forrest, Praetorian Bldg., Dallas, Zone 1, consult. engrs. R. B. Thomas, 4700 Drexel Dr., Highland Park, Dallas 5, engr. CD 1/24—ENR 10/19.

★**Va., Newport News**—City Council, City Hall, preliminary plans storm sewerage sys., East End storm sewers, $450,000; Virginia Ave., 34 to 32 Sts., $150,000; Huntington Ave., 34 to 32 Sts., $80,000; sewage treatment plant expan. or building, Boat Harbor treatment plant, $768,000. Financing not provided.

W. Va., Fairmont—City, City Hall, sewers. $45,000. S. A. Shuttleworth, City Hall, city engr.

★**W. Va., Morgantown**—City, 389 Spruce St., plans 75% completed combined storm and sanitary sewers, Midway Addn., $14,588; Old Deckers Creek Channel, $32,741; Snider St. exten., $20,057; city wide, $239,368; University Ave., $17,614; sewage disposal plant, $262,400; sewage collection sys. intercepting sewer, $121,000; Deckers Creek sewer, $121,100. Land rights not cleared, legal obstacles to be overcome, financing not provided. H. Boyles, 389 Spruce St., Planning Bd. engr.

Wis., Cudahy—City, City Hall, plans 80% completed repairing, replacing 18- to 27-in. sanitary sewers, repairing, realigning with vitr. clay 18- to 47-in. concrete relief sewer, $93,000. H. C. Webster & Son, 739 N. 2 St., Milwaukee, Zone 3, consult. engrs. CD 12/21—ENR 1/11.

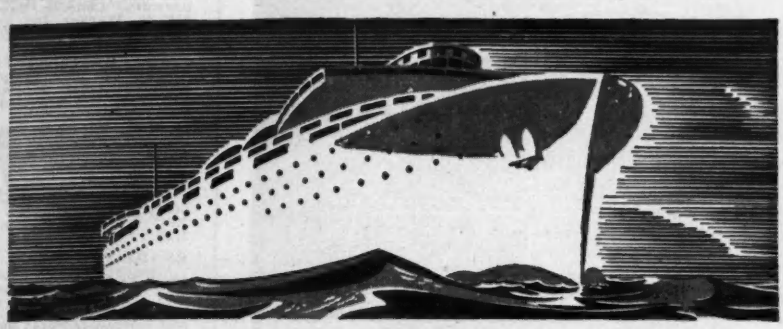
Wis., Delavan—City, plans 10% completed sewage treatment plant, $70,000. Financing not provided. F. Jensen, Elkhorn, consult. engr. J. Diagan, Burlington, engr. CD 12/21—ENR 1/11.

Wis., Eau Claire—City, City Hall, plans under way garbage incinerator, $35,000. Land rights not cleared, financing not provided. A. R. Garnock, City Hall, city engr. CD 1/25/43—ENR 1/28/43.

★**Wis., Green Bay**—City, City Hall, plans 50% completed storm water and sanitary sewer separation program, $2,000,000; plans 30% completed sanitary sewers in several streets, $70,000. Land rights not cleared, legal obstacles to be overcome, financing not provided. F. J. Steeno, City Hall, city engr.

Wis., Madison—City, City Hall, plans under way sanitary sewer in Wingra Creek Parkway, $37,000; box culvert drain, Waterschiedt Plat, $42,000. Financing not provided. T. F. Harrington, City Hall, city engr.

Wis., Madison—City, J. R. Law, mayor, City Hall, plans completed sanitary sewer and lift Olbrich Park and Lanning Pl., $111,094. Financing not provided.



Your ship comes in

When the ship's engines have the cylinders treated with PORUS-KROME . . . *your ship comes in.* It is mighty important in marine engines to do everything possible to prevent the ship being held up for engine repairs far from home.

This is equally true when "your ship" is a bus . . . or a truck . . . or a farm tractor working the far forty. Reliability of engine performance, which assures that you will always get home, is most important.

PORUS-KROME, because of its peculiar characteristics, reduces scoring and scuffing and the risk of piston seizure to the absolute minimum. It not only adds to the reliability of the engine, but it multiplies the life of the cylinders from four to twenty times, thus greatly reducing costs of overhauling for cylinder repairs.

PORUS-KROME, applied to cylinder bores by the Van der Horst process, is pure, hard chromium which has myriads of tiny pores and channels in its surface. These pores and channels serve as reservoirs which hold lubricating oil and feed it back to the cylinder surface as needed. Better lubrication, plus the fact that chromium is so much harder than iron or steel, reduces wear to a minimum.

Plan now to have PORUS-KROME in your gasoline and Diesel engines. Write for booklet telling more about PORUS-KROME.

PORUS - KROME

Good for the Life of your Engines

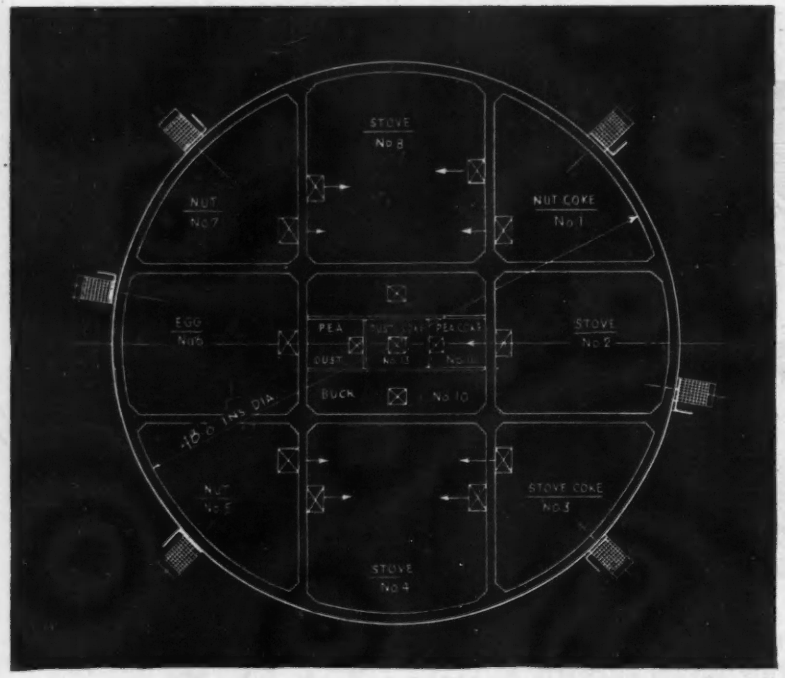
VAN DER HORST

U. S. PATENTS 2,048,578 AND 2,314,604

VAN DER HORST CORPORATION OF AMERICA

AN AFFILIATE OF DRESSER INDUSTRIES

OLEAN • NEW YORK
CLEVELAND 11 • OHIO



A Lot of Storage in a Small Space

8 Large Pockets
5 Small Pockets

This is a concrete coal storage and handling pocket recently designed and constructed for Snider Fuel Company, Charlestown, Mass.

Each large pocket has one outside and one inside loading chute. Each small pocket has one chute. The weighing platform is extra long extending along the entire tunnel thus permitting the driver to load and weigh split loads without getting off the scales. Such an arrangement obviously provides the owner with large storage capacity, plant compactness and operating flexibility.

Concrete storage bins and tanks are NICHOLSON Specialties. Our engineers have concentrated on the design and construction of these important industrial units for more than thirty years. It is a subject they know thoroughly.

I2-NC-I

THE NICHOLSON CO.

Ten Rockefeller Plaza, New York 20, N. Y.

POSTWAR PROJECTS (Cont'd.)

Wis., South Milwaukee—City, City Hall, plans 30% completed extens., relaying storm and sanitary sewers, $200,000. Financing not provided. Censoer, Townsend & Associates, 211 N. Wacker Dr., Chicago, Ill., consult. engrs. O. McCann, City Hall, city engr. CD 7/19—ENR 8/19.

Wis., Wauwatosa—[illegible] 7616 Harwood Ave., plans 30% completed concrete storm and vitr. clay sanitary sewers, $250,000. Financing not provided. [illegible] F. Linnan, City Hall, engr.

★**Man., Winnipeg**—Municipality, relief sewers in Colony, Cornish, Hannatyne, River, Assiniboine, Robert, Annacy and Selkirk Dists. $5,000,000. W. M. Hurst, City Hall, engr.

Ont., North Bay—City, sewage disposal plant. About $100,000. Gore & Storrie, 1130 Bay St., Toronto, engrs. CD 3/3—ENR 3/23.

READY FOR BIDS

★**Fla., Jacksonville**—City, City Hall, plans completed $3,689,500 program (projects designated by color and number) impvts. storm sewers and drainage (Brown 8) $578,000, (Green 10) $445,000, (Green 43) $100,000, (Blue 48) $80,000, (Blue 13) $77,000, (Blue 5-42 and misc.) $53,500, (Blue 6 and 29) $26,500 (Blue 28 and 29) $31,000, (Green misc.) $50,000; (Green 45) $33,500, (Green 46) $220,000, (Green 7) $100,000, (Green 33) $37,500 (Green 9) $60,000, (Red misc.) $50,000, (Red, McCoys Creek area) $200,000, (Red 44) $67,000, (Red 2) $35,000, (Red 21) $60,000, (Red 17) $117,000, (Red 18 and 27) $47,000, (Yellow 41 and misc.) $44,750, (Yellow 11) $102,500, (Yellow 16) $190,000, (Yellow 14 and 21) $35,250, (Yellow 15) $57,000, (Yellow 34) $43,500, (Yellow 4 and 12) $39,000, (Yellow 1) $48,000, (Brown misc.) $39,500, (Brown 47) $60,000, (Brown 30) $140,000, (Brown 25) $87,500, (Brown—no number) $74,000, (Brown 22 and 32) $30,000, (Brown 19-20-35) $43,000,. (Brown 39) $30,700, (Brown 23 and 40) $31,250, (Brown 37) $57,000, (Brown 3) $90,000. Financing available. W. E. Shedden, Engineering Bldg., city mgr.

★**Md., Baltimore**—City, City Hall, plans completed storm water sewers Mount Royal Terrace, B.C. 47, $15,000; Washburn Ave. and 10 St., B.C. 48, $40,000; south of 41 St. and Buena Vista Ave., B.C. 49, $60,000; Dundalk Sanitary System, B.C. 50, $900,000; pump. stations for Dundalk Sanitary sys., B.C. 51, $330,000, and for Brooklyn Sanitary Sys., B.C. 52, $302,000; sewers East Branch Herring Run, B.C. 53, $150,000; East low level interceptor sewer Boston St., B.C. 54, $350,000; 2 vacuum filters in sewage treatment plant, B.C. 59, $70,000; 2 sludge digestion tanks, B.C. 60, $430,000. Financing available. N. L. Smith, City Hall, ch. engr. CD 1/12—ENR 1/25.

Pa., Stroudsburg — Stroudsburg Boro, Stroudsburg, plans completed sanitary sewers. $100,000. E. C. Hess, 33 N. 7 St., engr.

Tex., Mart—Town, plans completed sanitary sewer exten. $30,000. Financing provided. Koch & Fowler, Great National Life Bldg., Dallas, consult. engrs. CD 4/20—ENR 5/4.

★**Va., Winchester**—City, City Hall, plans completed sewage treatment plant, relief sewers, trunk sewer exten., lateral sewers. $500,000. Alexander Potter Associates, 50 Church St., New York 7, N. Y., consult. engrs. J. R. Brandon, City Hall, city engr.

Ready for Bids

Of $17,000,000,000 of proposed postwar construction at beginning of 1945 only $500,000,000 was reported "ready for bids", plans complete and financing available.

If you have projects "ready for bids", please send them in to be added to the total above to give a measure of the materials that will be needed to relax restrictions and go ahead with civilian work.

Send ready-for-bids projects news to Elsie Eaves, Manager, Business News Department, Engineering News-Record, 33 W. 42 St., New York 18, N. Y.

PROJECTS CANCELLED

N. Y., Johnstown—Bd. P. Wks., City Hall, project cancelled sewage disposal plant. $308,000. CD 12/15/43—ENR 12/23/43.

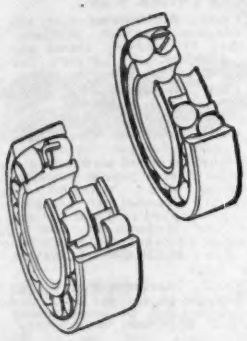
BRIDGES

PROPOSED WORK

★**Calif., Fresno**—City, City Hall, reconstructing Fresno St. subway, $175,000; grade separation, south end of Fresno, $250,000; 2 bridges across Dry Creek, $30,000; Divisadero St. subway, $100,000. CD 9/8/44—ENR 9/21/44.

★**Calif., San Francisco**—City and San Francisco Co., City Hall, first postwar year, Proj. 28, Islais Creek Bridge $85,000, Proj. 32, Evans Ave. Bridge $88,000, five following years, Proj. 28, Islais Creek Bridge $1,155,000, Proj. 40, Stanley Drive underpass $210,000, Proj. 47, Sixth Street viaduct $4,431,000, Proj. 41, reconstructing Mission Viaduct $290,000, for Bureau Engineering, Hall of Justice.

Built by THE GALION IRON WORKS & MFG. CO.



Making tough jobs easy!

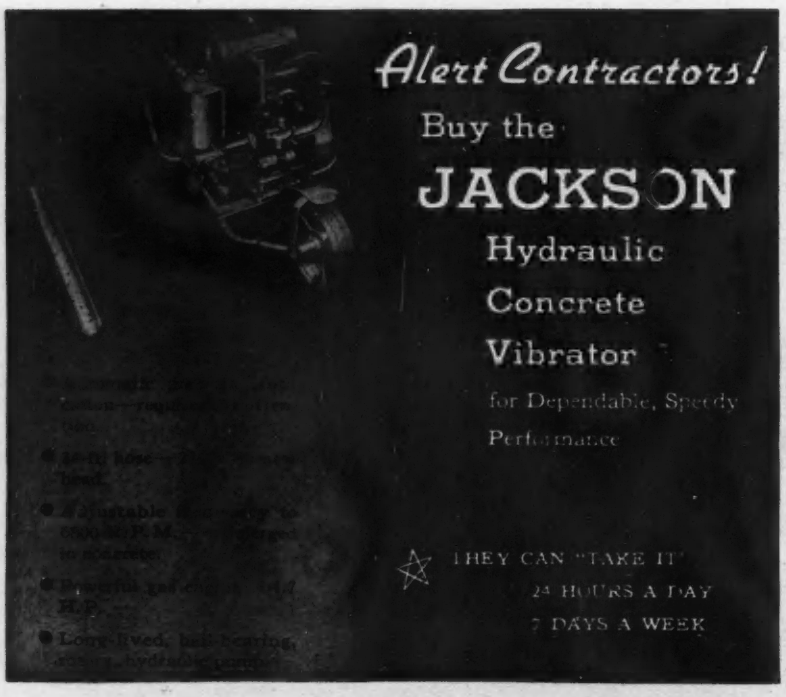
Pressing road building material into a smooth surface with this Galion Variable Weight Tandem Roller is as easy as pressing a pair of trousers. For this roller is designed not only for new construction work, but for resurfacing, rebuilding and widening of old roads as well. Its SKF Bearings are designed for making tough jobs *easy*, too. Years of taking the driving load and of combining proper gear mesh with smooth, trouble-free performance is proof of *that*. When *you* consider a machine for a tough job, consider the bearings. Make sure they are SKF's. 5736

SKF INDUSTRIES, INC., PHILA. 34, PA.

SPECIFY

SKF

BEARINGS



ELECTRIC TAMPER & EQUIPMENT CO.
LUDINGTON, MICHIGAN

JAEGER "SURE PRIME"

—the Pumps that exceed their promises

with up to 5 times faster priming, with hi-head, hi-capacity performance, with thousands of extra hours of trouble-free service.

Self-cleaning design, replaceable liners, longest life seal, heavy duty construction thruout.

Every unit individually tested and certified—you *know* you're getting the best.

Sizes 3000 to over 200,000 G.P.H.

52 Lb. Bantam —3000 G.P.H.

THE JAEGER MACHINE CO.
200 Dublin Ave., Columbus, Ohio

Equipment and Facilities for

BULKHEADS
★
WHARF CONSTRUCTION
PILEDRIVING
★
MARINE REPAIRS

Call or write us concerning your immediate or future projects.

DELAWARE BAY SHIPBUILDING CO., INC.
LEESBURG, NEW JERSEY
Phone: Port Norris 177

POSTWAR PROJECTS (Cont'd.)

Calif., San Jose—Santa Clara Co., Cu... House, Thomas Road Bridge, $40,000; Fo... Road Bridge, $30,000; Story Road Brid... $25,000; McKee Road Culvert, $65,000; Si... kaw Road Bridges, $15,000; Camden Av... Bridges, $20,000; Montague Road Brid... $20,000; Fremont Ave. Bridge (over Step... Creek), $15,000; Grant Road Culverts, $1... 000; Silver Creek Drainage, $75,000.

Conn., Manchester—State, Wm. J. C... hy. comr., State Office Bldg., Hartfo... 105 ft. underpass incl. steel girder rail... track bridge over Wilbur Cross Hy. $100,... Financing not provided.

Maryland—State Road Comn., 108 E. La... ington St., Baltimore, grade crossing eli... ination at Sylmar and bypassing Rising Su... S.R. 3-2, Cecil Co., $286,500; bridge at Sandy Hook, S.R. A-1, $178,... Washington Co. Financing not provided.

★**Md., Baltimore**—City, City Hall, brid... over Colgate Creek, B.C. 157, $830,... Financing available.

Md., Hagerstown—Municipality, brid... over Antietam Creek, Mt. Etna Rd., 21-D-3... $45,000. Financing not provided.

★**Tenn., Knoxville**—City, City Hall Pur... rebuilding bridge, Hway. at Bluff St... $165,400; rebuilding rein.-con. old Weste... Ave. viaduct, $193,000; rein.-con. bridges o... Oldham Ave. to Southern Ry., $321,000; ... Concord St., $26,000; bridge over Tennes... River at Wilder St., $1,710,000; on Barn... Ave. at Southern Ry., $134,500; Randolp... St. at Southern Ry., $100,000; underpass ... Washington at Southern Ry., $100,000.

Wis., Madison—City, J. R. Law, mayo... City Hall, bridges over Wingra Creek, Lak... side St., $20,000; on Fitchburg St., $20,... Financing not provided.

Ont., Kitchener—City, subway on Kin... St. $375,000. S. Shupe, City Hall, engr.

Ont., London—City, K. G. Crawford, cit... City Hall, subway at Ridout St. C.P.R. cross... ing, about $75,000.

PLANS UNDER WAY

★**Calif., Burlingame**—City, City Hall, un... derpass beneath Southern Pacific ... Market St. railway tracks and California... Dr., $500,000. C. Longson, City Hall, cit... engr.

★**Calif., Oakland**—City, City Hall, 2 un... derpasses, $1,800,000. W. Frickstad... City Hall, engr.

★**Calif., Stockton**—City, City Hall, bridg... across Mormon Channel at Ophir St... and Smith's Canal at Pershing Ave., $40,000... railroad bridge across Stockton Channel a... Pershing Ave.; vehicular bridge acro... Stockton Channel at Lincoln St.; bridg... across McLeod's Lake to connect Mine... Ave. and Madison St., and bridges acro... Mormon Channel at Lincoln St. and Pershi... ing Ave., $1,250,000. L. Payton, City Hall... city engr.

★**Calif., Stockton**—San Joaquin Co., Coun... House, 13 bridges or viaducts, $918,87... reconstructing or constructing 9 addi... bridges, $570,600; constructing 10 railroa... underpasses, incl. one on Harding Way... $824,600. J. B. Manthey, Court House, cl... engr. CD 11/15/43, 1/21/44—ENR 11/18/43... 2/10/44.

★**Kentucky**—Dpt. Hys., Frankfort, plans... under way 2.01 mi. bridge, approaches... at Barren River, Scottsville-Smith Grove... Rd., Ky. 101, Allen and Warren Counties... $160,000; bridge, approaches over Cumber... land River, 0.431 mi. Pineville-Harlan Rd.... at Wasiota, U. S. 119, Bell Co., $230,000... Yellow Creek Bridge on Cumberland Ave.... in Middlesboro, U. S. 25-E, Bell Co., $20,000... Sinking Creek Bridge and approaches, 0.60... mi. Hardinsburg-Union Star Rd., Ky. 259... Breckinridge, $90,000; bridge and approaches... 2.208 mi. Morgantown-Hartford Rd., K... Aberdeen, Ky. 71, Butler Co., $330,000... Four Mills Creek Bridge and approaches... 1.032 mi. Newport-Maysville Rd., Campbell... Co., $135,000; Lick Creek Bridge, approaches... 1.208 mi. Ghent-Sanders Rd., Ky. 47, Carroll... Co., $26,000; bridge and approaches, 0.60... mi. Liberty-Russell Springs Rd. south of... Liberty, Ky. 35, Casey Co., $107,000; bridge... over Little River, 0.53 mi. Hopkinsville-Pe... Dee Rd., Trigg Co. Line, Ky. 164, Christian... Co., $50,000; Green River Bridge, 0.69 mi.... Brownsville-Lietchfield Rd., Brownsville... Ky. 65, Edmonson Co., $530,000; 2 mi. ap... proaches to Clay-Ferry Bridge on Lexington-... Richmond Rd., Fayette and Maidson Coun... ties, $80,000; 2.064 mi. bridge and curve re... vision, Lexington-Harrodsburg Rd., U. S.... 68, Fayette and Jessamine Counties, $100,... 000; Eagle Creek Bridge, 0.075 mi. Sparta-... Owenton Rd., Sparta, Ky. 25, Gallatin Co.,... $150,000; 3 bridges, approaches 1.035 mi.... Mayfield-Tennessee Rd., $75,000; bridges,... approaches over Little Barren River, 0.45... mi. Pierce-Crail Hope Three Springs Rd.,... Ky. 218, Green Co., $59,000; bridge, ap... proaches over Green River, 0.375 mi. Greens... burg-Hardyville Rd., Ky. 88, Green Co.,... $151,000; bridge, approach over river, 0.58... mi. Greensburg-Columbia Rd., Ky. 61, Green... Co., $189,000; bridge over Poor Fork and... L & N overhead, 0.588 mi. Harlan-Hyden... Rd., Baxter, Ky. 257, Harlan Co., $151,000;... bridge, approaches over Licking River at... Cynthiana, 1.082 mi. Cynthiana-Georgetown... Rd., U. S. 62, Harrison Co., $210,000; under-

Travel Folders will be a Sure Sign

The big opportunities that Peace will bring you will be paired with big problems, too. Expanding private and public projects are going to boom business for you. There'll be problems with each of these new jobs.

Will you be able to solve them? American Mutual can help you solve them.

Use our long experience with contractors and construction engineers to help you get your jobs done faster, more easily.

American Mutual will help you provide complete, foolproof insurance protection—assist you in meeting unusual as well as normal safety problems so that personal injury and property damage may be prevented—give you needed claim service and medical help when you need them.

Send today for American Mutual's *free* "Five Extras" booklet describing the five extras you get:

1. *Construction-wise safety engineering experience*
2. *Construction-wise claim and medical service*
3. *Opportunity to lower insurance costs**
4. *Trained insurance experts*
5. *The confidence inspired by the name "American Mutual" on any insurance contract.*

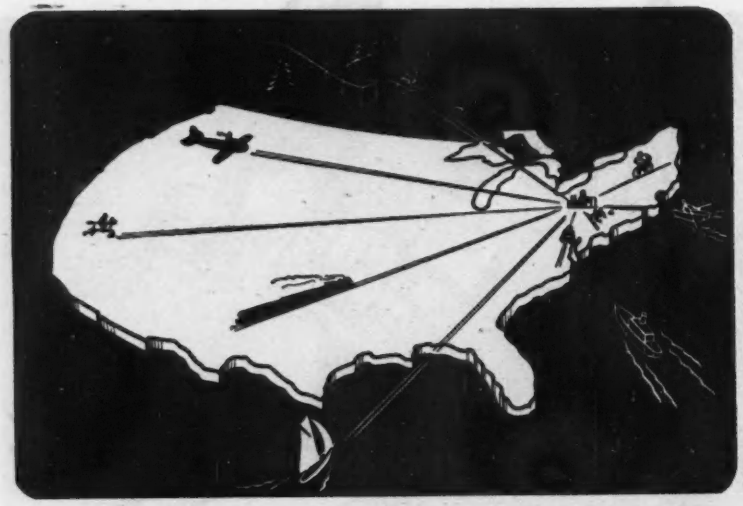
**Dividends to policyholders have never been less than 20%.*

Another free booklet, too! Send also for American Mutual's "Foremanship and Accident Prevention in Construction." Ask American Mutual Liability Insurance Company, Dept. O-34, 142 Berkeley Street, Boston 16, Mass.

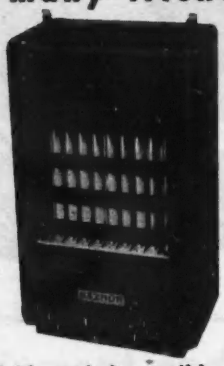
Your helping hand in building tomorrow's "new worlds"

AMERICAN MUTUAL

The first American Liability insurance company



we never knew we had so many friends



Orders for Reznor Heaters keep rolling in from all parts of the country.

Deliveries still haunt us because of delayed shipments of motors and other materials, man power limitations, and priorities.

But we appreciate your interest in Reznor products and we only hope we can serve you to your satisfaction.

In many cases, it is impossible to give delivery date upon receipt of order. However, the information is furnished just as quickly as it is possible for us to schedule a reliable delivery date. Nevertheless, most of our orders are being shipped "as promised."

Your co-operation and continued interest in Reznor Heaters will be appreciated.

REZNOR MANUFACTURING CO. **REZNOR** 108 JAMES STREET MERCER, PENNA.

"GAS HEATERS EXCLUSIVELY SINCE 1888"

SASGEN★ ★DERRICKS

Complete Range of Types and Sizes Get Our Catalog

SASGEN DERRICK CO.
3101 Grand Ave. Chicago, Ill.

CUSTOM BUILT **GEARS** of all Types and Sizes

For more than forty years we have specialized in cutting spur, bevel, spiral, and worm gears in all practical materials and sizes from ½" to 30 ft. in diameter.

THE EARLE GEAR & MACHINE CO.
4717 Stanton Ave., Philadelphia, Penna.

EARLE GEARS

POSTWAR PROJECTS (Cont'd.)

pass, approaches 0.2 mi. Madisonville-Sa... mento Rd., Ky. ... Hopkins Co., $... bridge over Lick Creek, 1.12 mi. Main ... Eddyville, U. S. ... Lyon Co., $... overhead grade separation at L & N R. ... tracks, South Richmond, U. S. 25, Madi... Co., $370,000; 2 ... approaches ... Hardin and Crab ... Creeks, Lebanon-... Haven Rd., Ky. ... and 52, Marion ... $49,000; bridge over ... Fall Creek, ... mi. Calhoun-Poverty ... in Calhoun, ... 256, McLean Co., $... Bridges, approaches, ... mi. Tompkinsv... Glasgow Rd., Ky. ... Monroe Co., $... bridge over Pond ... 4.223 mi. Cen... City-Madisonville ... Earles to Hop... Co. line, Ky. 70, ... burg Co., $... Pottinger Creek ... approaches, ... mi. New Haven-Lebanon Rd., Ky. 52, Nel... Co., $23,000; Beech ... Bridge, approach... 0.49 mi. Bloomfield-... field Rd., Ky. ... Nelson and Washington Counties, $... bridge over Eagle ... Creek and approa... 0.276 mi. Sanders-New ... Liberty Rd. at ... ders, Ky. 36, Owen Co., $134,000; bri... approaches over South Fork Cumberla... River, Burnside-Monticello Rd., Burnsi... Ky. 90, $595,000; Pitman Creek Bridges, ... proaches, 1.3 mi. Somerset-Burnside Rd., ... S. 27, $370,000; Cumberland River Brid... approaches, 2.955 mi. Somerset-Burnside R... U. S. 27, $1,055,000, all foregoing Pulaski C... Greasy Creek bridge, approaches on 0.7 ... Jamestown-Albany Rd., Ky. 35, Russell C... $149,000; Green River Bridge, approac... 1.747 mi. Campsville-Columbia Rd., Ky. ... Taylor Co., $180,000; ... bridge, approaches on ... fork of Elk Creek and Pond River, ... mi. Elkton-Kirmansville Rd., Ky. 181, To... Co., $83,000; bridges on Ky. 93 and ... on Ky. 274, both in Cadiz, $144,000; 0.2... mi. bridge over Little River, Cadiz-Jul... Rd., Ky. 272, $54,000, both Trigg Co.; 0.3... mi. bridge, approaches over Little Kentuc... River, at Ewings Fork, Ky. 37, Trimble Co... $55,000; Lost Creek Bridge, approache... 0.284 mi. Morganfield-Uniontown Rd., K... 130, Union Co., $40,000; Goose Pond Brid... approaches 0.518 mi. Morganfield-Shawn... town Rd., Ky. 56, $40,000, both Union Co... underpass bridge, approaches 0.57 ... Bowling Green-Franklin rd., south ... Bowling Green, U. S. 31W, Warren Co... $115,000; replacing timber structures on 15 ... mi. Dixon-Slaughters Rd., Ky. 138, Webst... Co., $95,000; Crab Orchard Creek Bridge, ... approaches an 0.218 mi. Clay Fishtrap-... Marion Rd., Ky. 132, Webster Co., $27,0... Financing not provided. T. H. Cutler, Frank... fort, state hy. engr.

★**Kentucky**—Dpt. Hys., Frankfort, plans completed 1.467 mi. bridge and ap... proaches over Kentucky River, U. S. 42... Louisville-Cincinnati Rd., $637,000; 0.0... mi. approaches to Kentucky River Bridge, ... Louisville-Cincinnati Rd., $19,000; 0.795 mi. ... bridges, approaches over Whites Run and ... Goose Creek, on Carrollton-Worthville Rd., ... U. S. 227, $82,000, all foregoing Carroll Co.; ... 0.235 mi. bridge, approaches over Green ... River, Hodgenville-Glasgow Rd., U. S. 31E, ... Rio, Hart Co., $270,000; overhead crossing of ... L & N R. R. on proposed bypass of Wil... liamsburg, U. S. 25-W, Whitley Co., $23,000; ... 0.351 mi. bridge, approach Cave City-Sulphur ... Well Rd., Sulphur Well, Ky. 70, Metcalfe ... Co., $95,000; 0.388 mi. Beaver Creek Bridge, ... Monticello-Albany Rd., Ky. 90, Wayne Co., ... $122,000; 0.416 mi. Otter Creek Bridge, ... Monticello-Albany Rd., Ky. 90, Wayne Co., ... $143,000. Financing not provided. C. H. ... Cutler, Frankfort, hy. engr.

★**Maryland**—State Road Comn., 108 E. ... Lexington St., Baltimore, plans under ... way Harbor Bridge-Southern by-pass of ... city, S.R. 2, $12,500,000. J. E. Greiner Co., ... 1201 St. Paul St., Baltimore, Zone 2, consult. ... engrs.

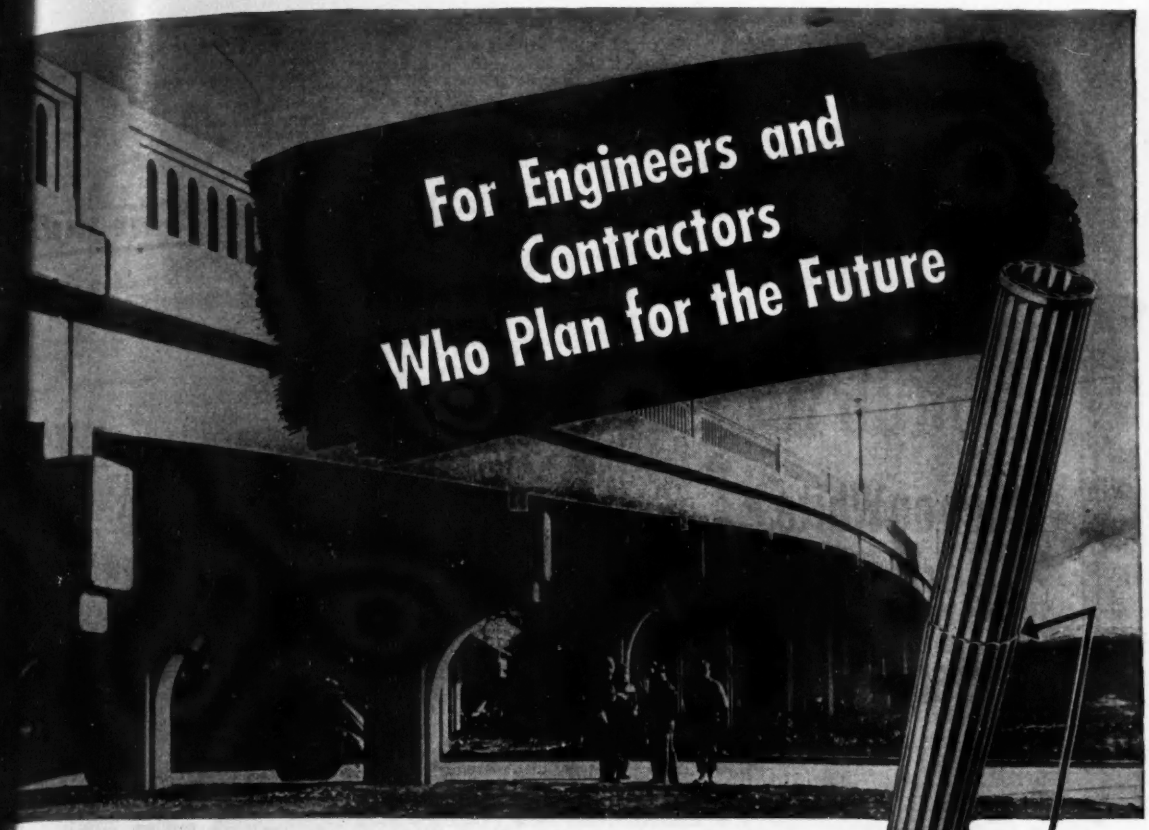
★**Maryland**—State Road Comn., 108 E. Lexington St., Baltimore, plans 40% completed replacing underpass at Silver Spring, Montgomery Co., $877,000; plans 95% completed approaches to proposed bridge over C & D Canal, S.R. 2-1, Cecil Co. $1,100,000. Financing not provided. W. T. Ballard, ch. engr.

★**Maryland**—State Road Comn., 108 E. Lexington St., Baltimore, bridges, approaches at Spa Creek, S.R. 2-16, Anne Arundel Co., $451,530; eliminating grade crossing on Keyser-McCool Rd., S.R. A-13, Allegany Co., $477,000; eliminating narrow bridge, at Clark's Distillery S.R. 1-7, Allegany Co., $65,000; superstructure bridge over Potomac River, S.R. A-2, $735,000. Financing not provided. W. T. Ballard, ch. engr.

Maryland — State Road Comn., 108 East Lexington St., Baltimore, preliminary plans 30% completed grade crossing elimination at Halethorpe, S.R. 3, Baltimore Co., $388,000. Financing not provided. W. T. Ballard, ch. engr. CD 1/26/44—ENR 2/10/44.

Md., Baltimore—City, City Hall, plans under way deck on drawn span over Curtis Creek, B.C. 158, $60,000. Financing available. Hall, Turpin & Wachter, 10 West Chase St., Zone 1, consult. engrs.

Md., Baltimore—City, City Hall, plans under way modernizing drawn span and operating equip. Hanover Street Bridge, B.C. 65, $75,000. Financing provided. J. E. Greiner Co., 1201 St. Paul St., Baltimore, Zone 2, consult. engrs. N. L. Smith, Municipal Bldg., ch. engr. CD 1/26/44—ENR 2/10/44 under Maryland.



THESE four special Monotube features will make the installation of piled foundations for bridges, highway overpasses, marine construction, airports, and large buildings easier than before:

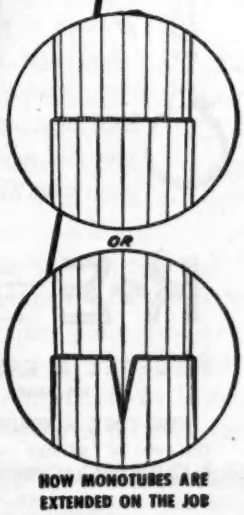
HANDLING — *Monotube lightness, makes for fast, economical, easy handling.*

DRIVING — *Monotube tapered fluted construction, combined with great structural strength, permits faster driving—without heavy core or mandrel.*

EXTENSION — *Extendible Monotubes can be quickly and easily extended on the job to meet the requirements of varying soil conditions.*

INSPECTION — *Monotube tubular design permits fast, sure inspection prior to concreting.*

Speed your first postwar project . . . make your work easier, more profitable with Monotubes. Available in a gauge, size, and taper to meet all your needs. Send for Catalog 68A. The Union Metal Manufacturing Company, Canton 5, Ohio.



HOW MONOTUBES ARE EXTENDED ON THE JOB

UNION METAL

Monotube Tapered Piles

Black on White for Better Sight

WYTEFACE "A" Steel Tapes have *raised* black graduations on a crack-proof white surface. Easy to read in any light, from any angle. Faster measurements with fewer errors. Designed for hard service. White background is protected by raised steel markings and rims. Resists abrasion from rails, pipe, rocks, concrete. Protected against rust. See your dealer. Write for catalog.

K+E — Drafting Reproduction Surveying Equipment and Materials Slide Rules Measuring Tapes

KEUFFEL & ESSER CO.
EST. 1867
NEW YORK • HOBOKEN, N. J.
CHICAGO • DETROIT • ST. LOUIS
SAN FRANCISCO • LOS ANGELES • MONTREAL

WYTEFACE "A"
STEEL MEASURING TAPES

POSTWAR PROJECTS (Cont'd.)

Md., Hagerstown—City, City Hall, plans 90% completed I-beam bridge with concrete deck, $45,000. C. W. Stumpp, City Hall, city engr.

Md., Towson — Baltimore Co., Towson, plans under way bridges over Bear Creek 3-26, $350,000; over St. Agnes Lake, 3-46, $40,000. Financing not provided.

Md., Towson — Baltimore Co., Towson, plans completed bridges, Dolfield Rd., 3-22, $5,000; Butler Rd., 3-23, $75,000; Gold Ring Rd., 3-24, $100,000; Roland Ave., 3-25, $20,000. Financing not provided.

Mass., Worcester — City, P. Wks., City Hall, bridge over B. & M. R. R., Lake View View Dist. $155,000. Financing not provided. E. R. Perry, City Hall, engr.

Mich., Lapeer — Lapeer Co. Rd. Comn., Lapeer, plans completed 3 span 120 ft. bridge, $50,000. Financing not provided; plans 70% completed 3 span 134 ft. bridge, $45,000. Land rights not cleared and financing not provided. G. M. Foster, 804 Bauch Bldg., Lansing, consult. engrs. L. A. Gunderson, Lapeer, engr. CD 10/23—ENR 11/2.

Mo., St. Louis—City, M. M. Kinsey, pres., Bd. P. Serv., 304 City Hall, Zone 1, preparing plans reconstructing highway deck and straightening curves on the Douglas MacArthur Bridge across the Mississippi River, $140,000. C. E. Smith & Co., Railway Exch. Bldg., St. Louis, Zone 1, consult. engrs. CD 5/3—ENR 5/18.

★**New Jersey**—State Bd. Pub. Utility Comrs., State Capitol Bldg., Trenton, plans completed grade crossing elimination, Camden-Pennsauken Proj. 1 $200,000, and Proj. 2, $180,000, both Camden and Pennsauken Twp.; Haddonfield Proj. 1 $350,000, Proj. 2 $350,000, Proj. 3 $500,000, Proj. 4 $300,000, Proj. 5 $300,000, all foregoing in Haddonfield; Camden Proj. 1 $300,000, Proj. 2 $250,000, Proj. 3 $250,000, all in Camden; Camden-Woodlynne Proj., in Camden-Woodlynne, $350,000; Harlingen Proj., in Harlingen, $160,000; Hopewell Proj., in Hopewell, $160,000. Financing not provided.

N. Y., Flushing—Dpt. Parks, Arsenal Bldg., Central Park, 61 St. and Fifth Ave., New York, Zone 21, plans completed ten 2 span continuous steel plate girder 32' wide flange beam type bridges, incl. bridges over Lawrence, Main and 146 Sts., Kissena Blvd., in Kissena Corridor Park, Flushing Meadow Park to Kissena Park, No. P-87-Sect. 1, Contr. Q-300-543; bridges over Utopia Parkway, 185 and 58 Sts., Horace Harding Blvd., Fresh Meadow Lane in Kissena Corridor Park, Kissena Park to Cunningham Park, No. P-87, Sect. 2, Contr. Q-300-645; bridge over 164 St. in Kissena Park, P-110, Contr. Q-24-144. $458,000. Financing not provided. Waddell & Hardesty, 101 Park Ave., New York, Zone 17, engrs. CD 3/26/43, 3/6/44—ENR 4/1/43, 3/23/44.

N. Y., Oswego—City, City Hall, plans under way rebuilding Utica St. Bridge. $300,000, State Aid Planning Funds allotted.

O., Portsmouth—City, City Hall, 1 bridge, $25,000. Financing not provided. J. R. Parkinson, Portsmouth, engr.

Pa., Honesdale—Comrs. Wayne Co., Honesdale, plans by State Dpt. Hys., Bureau Eng., Harrisburg, approx. 75 ft. span rein.-con. bridge over Lackawaxen, 3 mi. upstream from here, $30,000.

Rhode Island—State Dpt. Hys. & Bridges, State House, Providence, plans completed Bridge 402, Nooseneck Hill Rd., Richmond. Over $25,000. Financing not provided. J. R. Worcester & Co., 79 Milk St., Boston, Mass., consult. engrs.

★**S. C., Columbia**—Richland Co., Columbia, steel, rein.-con. structure on concrete piers. $634,000. O. H. Joyner, Court House, engr.

Tex., Laredo—City, City Hall, addnl. connecting bridge over Arroya Zacate and replacing present old steel structure. $140,000. Financing not provided. F. C. Heins, Box 562, city engr. CD 1/10—ENR 1/25.

Va., Lynchburg—City, Box 60, City Hall, plans 60% completed 5 small concrete bridges, replacing steel structures, $80,000. Financing not provided. City Dpt. P. Wks., Box 60, City Hall, engr.

★**Va., Newport News**—City Council, City Hall, preliminary plans 28 St. bridge. $600,000. Financing not provided.

W. Va., Fairmont — City Hall, bridges, $54,000. S. A. Shuttleworth, City Hall, city engr.

Wis., Green Bay—City, City Hall, bridge for crossing E. River at Webster Ave. $60,000. F. J. Steeno, City Hall, city engr.

★**Wis., Madison**—City, J. R. Law, mayor, City Hall, plans under way grade separation at W. Washington St. and Railroad, $543,661. Financing not provided. T. F. Harrington, City Hall, city engr.

Wis., Wauwatosa—City, 7616 Harwood Ave., 3 small bridges. $30,000. Financing not provided. M. F. Linnan, City Hall, engr.

★**N. B., Fredericton**—Provincial Govt., Fredericton, eliminating railway crossings. $770,000. Dpt. P. Wks., Fredericton, engr.

READY FOR BIDS

Kan., Lawrence— ...glas Co., Lawrence, plans completed co... ...s substructure br... with continuous I-b... ...floor, $46,000. ... Larson, Court Hous... ...engr.

Wis., Appleton— ...City Hall, plans completed Oneida ... Bridge. $... L. M. Schindler, Ap... ...n, city engr. Sta... Hy. Comn., Madis... ...onsult. engr. ... 6/10/43—ENR 6/17/43

STREETS AND ROADS

PROPOSED WORK

Calif., Eureka — Humboldt Co., Co... House, 5.7 mi. hy. from Falk to Redwood Hy., $29,640; 15.5 mi. Redway to Thar... $96,000; 30.75 mi. Ferndale to Petrol... $107,626; 21 mi. Bridgeville to Blocksb... $112,500; 16.33 mi. Eureka to Kneela... $84,650.

★**Calif., Fresno**—City, City Hall, widen... Divisadero St., from Van Ness to Ol... Aves., and from Thesta St. to Glenn Ave... $110,000; widen, impro... Blackstone Ave. from Divisadero St. to Olive Ave., $250,... Ventura Ave. from Angus to 6 Sts., $80,... Belmont Ave. from Blackstone Ave. to ... St., $190,000; widening, paving Palm Ave... from N. H St. to Shields Ave., $820,000; ... surfacing downtown streets, $600,000; ... portion of limited access highway fro... Fresno and Divisadero Sts. northeasterly ... Clovis, $250,000. CD 9/8—ENR 9/21.

Calif., Roseville—City, City Hall, curb... and gutters, $134,452.

★**Calif., San Francisco**—City and San Fran... cisco Co., City Hall, first postwar proj... Proj. 18, Market St. reconstruction $8... Proj. 23, widening Guerrero St., Mari... to Army Sts. $320,000, Proj. 24, cent... island and paving 3 St. $119,000, Proj. 30, widening 2 St., Market to Harri... Sts. $67,000, Proj. 31, reconstructing pa... Mission St. $419,000, five following proj... Proj. 21, widening Army St. $251,000, pa... San Jose Ave. and Guerrero St. $1... 000, Proj. 31, reconstructing part Mi... sion St. $395,000, Proj. 35, exten. Clipp... St. $170,000, Proj. 38, widening Anza St... $63,000, Proj. 39, Stanley Drive Parkway... $161,000, Proj. 44, widening Trumbull ... $101,000, Proj. 46, repaving Marina Blvd... $176,000, Proj. 49, widening, exten. 12 st... McCoppin Sts. $245,000, Proj. 51, widenin... and Buena Vista Park tunnel, Waller St... $2,580,000, Proj. 52, widening Webster St... $185,000, Proj. 53, Bryant St. $188,000... Proj. 2301, Marginal Freeway $5,700,000, C... Bureau Engineering, Hall of Justice. C... 3/18/43—ENR 3/25/43.

★**Maryland**—State Road Comn., 108 Lex... ington St., Baltimore, 6 lane highway... Martin Blvd., Havre de Grace, S.R. 1-4... Baltimore and Harford Counties, $1,970,000... highway relocation at Inglehart, S.R. 1-13... $70,000; highway connection General's High... way, S.R. 2-6, $100,000; relocating Centra... Ave.-Mayo Rd. Hy., S.R. 2-8, $54,000, al... foregoing Anne Arundel Co.; highway re... placing Belfast-Piney Hill Rd., S.R.A. 1... $815,000; St. Charles Ave. alignment, S.R. ... 1-17, $36,500, both Baltimore Co.; Prince... Frederick By-Pass Rd., S.R. 3-3, Calvert ... Co., $75,000; Hampstead-Manchester By-... Pass Rd., S.R. 1-10, $120,000; widening ... lane hy., Westminster-Manchester Hy., ... S.R. 3-6, $765,000, both Carroll Co.; replac... ing hy. Big Mills to Vienna, S.R. 1-11, Dor... chester Co., $303,500; widening present ... lane hy. county line-Frederick Rd., S.R. ... 2-9, Frederick Co., $1,560,000; highway re... location Keyers-Pennsylvania Line, S. R. ... 3-7, Garrett Co., $92,500; highway align... ment Oakland toward Keyser, S.R. 1-6, Gar... rett Co., $290,000; Belair-Hickory, S.R. 3-1... Harford Co., $315,000; widening present ... lane hy. Rockville to Frederick, S.R. 3-4, ... Montgomery Co., $3,363,000; River Rd., S.R. ... 2-7, Montgomery Co., $550,000; replacing ... Pocomoke-Westover Hy., S.R. 2-10, Somer... set Co., $1,000,000; Easton By-Pass Rd., ... S.R. A-5, $488,500; hy. replacement, Wi... Holly-Big Mills, S.R. A-7, $848,000; Cordova ... Rd. to Skipton, S.R. 1-3, $636,500, all fore... going Talbot Co.; hy. relocation at Hills... boro, S.R. 3-10, Talbot and Caroline Coun... ties, $275,000; widening Hagerstown-Wil... liamsport Rd., S. R. 2-3, $790,000; highway ... alignment Sideling Mountain, S.R. 1-4, ... $365,000, both Washington Co.; relocating ... Salisbury-Delmar Hy., S.R. 3-4, $373,000; ... By-Pass Salisbury, S.R. 1-5, $700,000; both ... Wicomico Co.; replacing Pocomoke-Virginia ... Line Hy., S.R. A-8, $270,000; dual highway, ... Berlin-Herring Creek, S.R. 3-9, $455,000, ... both Worcester Co. Financing not provided.

Md., Annapolis—Anne Arundel Co., An... napolis, roads and bridges over Stoney ... Creek between Greeland Beach and Riviera ... Beach, 2-2, $385,000; roads and bridges, ... Old Colony Cove-North Beach Park, 2-1, ... $90,000. Financing not provided.

★**Md., Baltimore**—City, City Hall, con... structing Belvedere Ave. B.C. 28, ... $2,012,000; Belvedere Ave. connection, B.C. ... 29, $264,500; Cloverleaf at Chesapeake Ave. ... and Hanover St., B. C. 32, $225,000; Roland ... Ave., B. C. 35, $550,000; Green Spring Ave., ... B.C. 36, $3,132,000; O'Donnell St., B.C. 37, ... $3,068,000. Financing available.

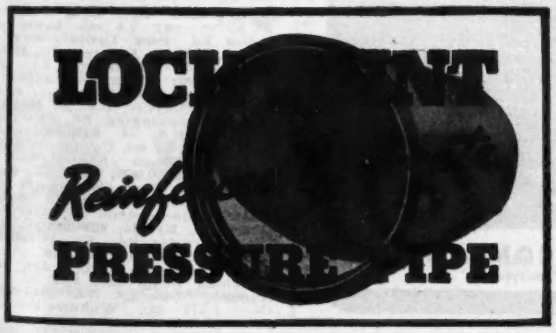
GIVE HIM PLENTY OF BIG JOBS TO DO

RIGHT NOW, on the home front, it's up to city officials and leading engineers to do their part in planning new municipal water mains and other public works projects. It's one way to have steady employment ready for local men when their present job is finished.

By specifying Lock Joint Reinforced Concrete Pressure Pipe for water supply lines, sewerage and drainage, you can fulfill your promise to your own returning men. For, the Lock Joint Pipe Company is prepared to come to your town, set up a temporary plant and employ 90% of local labor. As most of the supplies and materials will be purchased locally, there will be a direct benefit to your town merchants. As a result, a large proportion of the cost of the project will be spent right in your own community.

For more than three decades Lock Joint Pipe has played a vital part in the majority of large diameter water pipe contracts in the United States. When Victory comes, we stand ready to help you give your engineers, mechanics, carpenters, laborers and other skilled workers the jobs they will need.

Whether your project is large or small, for the present or the future, your 'phone call, telegram, cable or letter to any of our offices will bring a prompt reply.



LOCK JOINT PIPE COMPANY

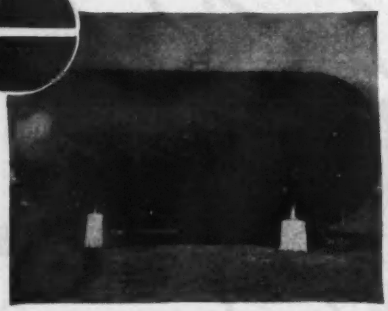
Established 1905

AMPERE, NEW JERSEY

Denver, Colo. • Chicago, Ill. • Kenilworth, N. J. • Kansas City, Mo. • Rock Island, Ill. Joplin, Mo. • Valley Park, Mo. • Cleveland, Ohio • Hartford, Conn. • Navarre, Ohio

SCOPE OF SERVICES *Lock Joint Pipe Company specializes in the manufacture and installation of Reinforced Concrete Pressure Pipe for Water Supply Mains as well as Concrete Pipe of all types for Sanitary Sewers, Storm Drains, Culverts and Subaqueous lines.*

For High Pressure GAS STORAGE

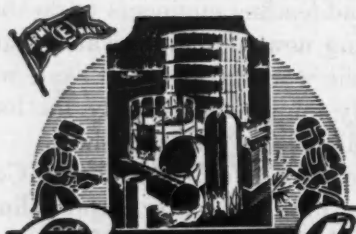


Stacey Brothers "Bullet" type high pressure tanks are regularly built for pressures up to 100 pounds. Higher pressure construction can be furnished on specification. These "Bullets" can be fitted into restricted areas, as they may be erected vertically or horizontally.

Special features of Stacey Brothers construction include . . . hemispherical heads with fewer seams . . . all seams permanently gastight . . . adequate provision for contraction and expansion . . . economical foundations . . . special interior bracing assures permanently true shape . . . etc. Let us figure on your requirements.

Photo shows a Stacey Brothers "Bullet." In addition to requiring less space and being unobstrusive in appearance, the comparatively low height of this horizontal gas storage tank makes for lower cost construction, erection, and maintenance.

THE STACEY BROS. Gas Construction Co.
One of the Dresser Industries
5535 Vine St., Cincinnati 16, Ohio



ALL-WELDED "BULLETS"

Stacey Brothers ENGINEERS • FABRICATORS ERECTORS • RECOGNIZED EXPERIENCE & FACILITIES

Generate Your Own Electricity for Low-Cost Power

Sheppard ALL-AMERICAN DIESEL

Horsepower Horse Sense

It's simply horse sense to buy your electricity as economically as you can. Sheppard Diesel Generating Sets provide cheap electricity because Sheppard Diesels operate efficiently on the cheapest fuel available. Investigate Sheppard Diesels today.

Sheppard Model 7 Power Unit direct-connected to a 5 kw single bearing generator with exciter

Send for free literature on Sheppard

POWER UNITS · GENERATING SETS · PUMPING UNITS

R. H. SHEPPARD COMPANY
410 Middle Street, Hanover, Pennsylvania

POSTWAR PROJE[CTS] (Cont'd.)

Md., Carrollton—[Mill] Co., Westmin[ster], imprv. roads, [$]7,000.

Md., Frostburg—[Mu]nicipality, [im]p. streets, 1-C4, $30,00[0]; [1]9, $40,000. Financ[ing] not provided.

Md., Hagerstown—[C]ity, City Hall, wi[ll] ing Pennsylvania A[ve.], 21-D-15, $10,[000]; Potomac St., 21-D-[19], $15,000; building mi. concrete alley, [21]-D-19, $30,000; by-pass street and [brid]ge over Penn. R[R], 21-D-25, $90,000; imp[rov] new streets, 2[1-] 27, $25,000; 1 mi. [con]crete alley pav[ing], 21-D-1, $15,000; [Sou]thern Ave. 21-D-[2], $35,500; Nottingham [Rd.], 21-D-3, $[30,000]; Jefferson St., 21-D-[8], $15,000; Antietam [St.], 21-D-10, $10,000; Br[ook]line Ave., 21-D-[11], $10,000; County Club Rd., 21-D-4, $[5,000]. Financing not provide[d].

Mo., Clayton (St. Louis, Zone 3, P. O.)—[City], City, A. H. Kerth, mgr. [of] ton St., $100,000 bond election Apr. 3, wi[ll] ing, paving streets on [Co]urt House Squa[re].

★**Nev., Reno**—City, City Hall, reconstruc[t] ing streets in business district, $80,[000]; paving all unpaved streets, alleys, $350,[000]; building curbs, gutters in connection w[ith] street paving program, $140,000.

S. D., Mound City—Comrs. Campbell C[o.], Mound City, road and bridge construc[tion] work, $35,000. Financing not provide[d]. O. J. Kundert, County Hy. Supt.

★**Tenn., Knoxville**—City, City Hall, Riv[er] front highway, $3,250,000; resurfac[ing] various city-wide streets, $4,900,000; wide[n] ing North Bway., Central to Cecil, $230,[000]; Sutherland and Euclid Aves., $1,800,[000]; W. 5 Ave. cutoff from Western Ave. [to] Bway., $595,750; ground survey under w[ay] widening Magnolia Ave. from Bway to Ja[mi]mine Ave., $1,400,000.

Tex., Center—Bd. Comrs. Shelby Co., T[ex.] Davis, judge, Center, farm to market roa[d], $50,000.

Va., Newport News—City Council, C[ity] Hall, preliminary plans elimination of dea[d] end streets by exten. 16 St., Jefferson [to] Marshall Aves., $47,000. Financing n[ot] provided.

★**Va., Newport News**—City Council, C[ity] Hall, preliminary plans street rebuildi[ng], $250,000; street paving, $752,750; 16th St[.] Jefferson to Marshall Aves., $47,700. Financ[ing] not provided.

Wis., Cudahy—City, City Hall, low co[st] bituminous roads, some small section co[n]crete paving, street and alley. $150,000.

★**Wis., Madison**—City, J. R. Law, mgr.; City Hall, repaving E. Washington [Ave.], $390,000; Bassett St., $22,000; Univers[ity] Ave., $112,000; E. Wilson St., $30,000; [S.] Johnson St., $57,000; Johnson St., $147,[000]; Ridgewood Ave., $15,000; E. Main St[.], $74,000; Webster St., $96,000; W. Mifflin St[.], $31,000; N. Livingston St., $15,000; Bla[ir] St., $25,000; cross town connection on 4 St[s.], $500,000. Financing not provided.

PLANS UNDER WAY

Calif., Oroville—City, City Hall, Montg[o]mery and Myers St. setback, addnl. asphalt[ic] concrete paving, reconstructing sidewa[lk] curbs and gutters. $125,000; grading, [as] cost bituminous macadam paving, $174,[000]; concrete sidewalks, curbs and gutte[rs], $79,000. Financing not provided. S. [E.] Norris, City Hall, engr.

Calif., Stockton—City, City Hall, widen[ing] 4 addnl. blocks of Charter Way to 4 lan[es], $65,000; imprv. portions Pershing Ave. a[nd] Charter Way, $95,000; imprv. Center an[d] Fremont Sts., in Civic Center, $50,000. [C.] Payton, City Hall, city engr.

★**Calif., Stockton**—San Joaquin Co., Co[un]ty House, widening, resurfacing, imprv. [2] major roads, $449,109; imprv. 9 addnl. hi[gh]ways, $669,582. J. B. Manthey, Court Hou[se], co. engr. CD 11/15/43—ENR 11/18/43

Fla., Stuart—City, City Hall, preliminar[y] plans street paving. $40,000-$50,000. Ra[y] sell & Axon, 4903 Delmar Blvd., St. Lou[is], Mo., consult. engrs.

Ga., Toccoa—City, City Hall, concrete cu[rb] and gutters, surface treatment on crushe[d] rock base, concrete storm sewers. $75,[000]. Financing not provided. The Harwood Bea[ty] Co., Spartanburg, S. C., consult. engrs.

★**Kentucky**—Dpt. Hys., Frankfort, pla[ns] under way 2.4 mi. Lawrenceburg-Ve[r]sailles Rd. from Lawrenceburg to Tyro [Bridge, U.S. 62, Anderson Co., $126,000; 5.[0] mi. Glasgow-Flippin Rd., Ky., 249, Barr[en] Co., $80,000; 5.5 mi. Burlington-Union Rd[.], $180,000; 4.1 mi. Covington-Lexington Rd[.] south of Florence, U.S. 25, $450,000; 5.3 mi[.] Covington-Lexington Rd., Walton to Gra[nt] Co. line, U.S. 25, $425,000, all foregoi[ng] Boone Co.; 7.5 mi. Covington-Lexington Rd[.] U.S. 25, Boone, Kenton and Frankl[in] Counties, $830,000; 6.5 mi. Catlettsburg [to] Grayson Rd. from Catlettsburg to Cannon[s]burg, New U.S. 60, Boyd Co., $450,000; 5.[0] mi. Danville-Lebanon Rd. from Parksville [to] Brumfield, Ky. 34, $290,000; 0.724 mi. Dan[v]ille-Lancaster Rd., Ky. 52, $45,000; 13.[1] mi. Danville-Springfield Rd., incl. overhe[ad] at Southern R. R., U.S. 150, $340,000, [all] foregoing Boyle Co.; 8.69 mi. Brooksvil[le] Augusta Rd. Ky. 19, $245,000, Bracke[n] Co.; 4.574 mi. Wilhurst-Hellechewa R[d.]

STOUT STEEL MUSCLES
for the Merchant Marine

The rigging for a typical cargo ship requires over 11,000 feet of wire rope, ranging in size from ¼ inch to 2¼ inches, and weighing over 10 tons. Scores of shipyards are building such ships—and using plenty of tough, dependable Wickwire Rope.

Oil fields, mines, logging camps, construction crews—and our fighting men abroad—also depend upon the stout steel muscles of Wickwire Wire Rope to do their heavy hoisting and hauling jobs. That's why—even with more equipment and working at full capacity 24 hours a day—we cannot keep up with the great demands for Wickwire Rope.

Since wire rope is harder to get, each length must be made to last longer. WISSCOLAY *Pre*formed Wire Rope, manufactured by Wickwire Spencer, not only lasts longer, but it's kink-resistant—easier to cut, splice and install—safer to handle.

If you have a wire rope problem our wire rope engineers will be happy to be of service. Call or write our nearest branch office or Wickwire Spencer Steel Company, 500 Fifth Avenue, New York 18, N. Y.

VALUABLE GUIDE FOR ALL ROPE USERS

Thousands of copies of "Know Your Ropes" have been sent to men in industry and the Services. Packed with ideas for making wire rope last longer this 82 page book contains 48 wire rope life-savers; 78 "right and wrong" illustrations, and 20 diagrams, tables, graphs, charts.

SEND FOR YOUR FREE COPY

Send your wire rope questions to:

WICKWIRE SPENCER STEEL COMPANY

500 FIFTH AVENUE, NEW YORK 18, N. Y.

Abilene • Buffalo • Chattanooga • Chicago • Detroit • Houston • Los Angeles • Philadelphia • San Francisco • Tulsa • Worcester

Twenty-two REASONS

Why *FLEX-PLANE* Dummy Joints are Necessary in Modern Concrete Pavements

- Reduces the Number of Expansion Joints
- More Dummy Joints Divide Contraction Openings
- Prevents Cracking
- Retards Creeping
- Controls Warping
- Reduces Curling
- Relieves Stress
- Lessens Bumps
- Minimizes Pumping
- Minimizes Panning
- Lessens Deterioration
- Lowest Cost
- Limits Maintenance Cost
- Anchored in Place—Is Permanent
- No Extrusion
- Localizes Expansion and Contraction
- Assists in Normalizing the Slabs
- Ribbon Joint is Continuous in Length
- Prevents Infiltration of Water
- Increases Strength of Slabs
- Produces Homogenous Structure
- Provides Expansion Relief for the Hot Upper Part of the Slab

FLEX-PLANE joint installing machines eliminate messy hand methods. Install all types of joints . . . ribbon, poured, premoulded, etc., with or without VIBRATION.

• *Ask for Equipment Specifications* •

FLEXIBLE ROAD JOINT MACHINE CO. WARREN, OHIO U. S. A.

STERLING QUALITY

STERLING PUMPS

SIMPLE
DEPENDABLE
RUGGED
•
CHOICE OF
LEADING
CONTRACTORS
•
WRITE FOR
LITERATURE

STERLING MACHINERY CORPORATION
405 Southwest Blvd., Kansas City

DOBBIE

Dobbie Foundry & Machine Co.

Niagara Falls, N. Y.

DERRICKS - WINCHES - SHEAVES

POSTWAR PROJECTS (Cont'd.)

from Wilhurst to Lee Co. line, 379, Breathitt Co., $158,000; Shoulder-Blade-Buckhorn Rd., to Buckhorn, Ky., 28, Perry Counties, $275,000; 8.129 mi. burg-Mooleyville Rd., Union Star to ville, Ky. 259, $,000; 11.547 mi. Addison Rd., 64, $218,000; Big Springs-C Rd., Ky. all foregoing Breckinridge Co.; Morgantown-Br ville Rd., Ky. $100,000, Butler den Rd., Calla and Graves Co. $110,000; 12 mi. from north of Alexandria to Pendl line, U.S. 27, Campbell Co., Newport-Maysville Rd., Oneanto to Dam 35, Ky. 8, Falmouth Rd., U.S. 27, Morgantown-Brownsville Rd., Ky. ing Campbell Co.; 9.637 mi. Mayfield-liffe Rd. from Graves Co. to Ballard lines, $500,000; 1.892 mi. Fulton-Metro Rd., Ky. 307, 2.8 mi. Grayson-Ashland Rd. from St., Grayson to near Stinson Creek, U.S. $250,000; 8.009 mi. Grayson-Cannonsburg Rd. from east of Grayson to Boyd Co. U.S. 60, $660,000; 4 mi. Morehead-Grayson Rd. to Bypass Olive Hill, U.S. 60, all foregoing Carter Co.; 2.227 mi. west route through Hopkinsville, U.S. $195,000; 0.532 mi. 9 St., Hopkinsville-41E, $42,000; 15.36 mi. Hopkinsville-mansville Rd., Ky. 107, $175,000, all Christian Co.; 3.96 mi. Hopkinsville-Springs Rd., Ky. 109, Christian and Counties, $310,000; 7.2 mi. Boonville Rd., Oneida to Owsley line, Ky. 11, $268,000; 9.081 mi. Barbourville Rd., Ky. 11, $460,000, both Co.; 2.7 mi. Cartwright-Ida Rd. from church to Ida, Ky. 55, Clinton Co., 7.505 mi. Tolu-Forts Ferry Rd., 9 mi. Marion-Sturgis Rd., $180,000; Salem-Dycusburg Rd., Ky. 133, foregoing Crittenden Co.; 4.265 mi. Burkesville-Albany Rd., south of ville and Cumberland River Bridge, Cumberland Co., $650,000; 6.725 mi. boro-Hartford Rd., Ky. 71, mi. Owensboro-Hawesville Rd. U.S. $110,000, both Daviess Co.; 1.5 mi. Ravenna Rd., Ky. 52, Estill Co., 2 mi. Lexington-Nicholasville Rd., Co., $137,000; 12.037 mi. Petersville Rd., Ky. 57 and 59, $210,000; 7.59 mi. Middle Creek Ky. 114 to David, Ky. 390, $138,000; Prestonburg-Pikesville Rd., Betsy Layne U.S. 23, $59,000, both Floyd Co.; Nicholasville-Lancaster Rd., U.S. rard Co., $440,000; 8.7 mi. Covington-Lexington Rd., Boone Co. line to Dry Ridge, 25, Grant Co., $530,000; 5.343 mi. Melber Rd., Lowes to McCracken Co. at Melber, Ky. 340, $95,000; 11.949 mi. field-Wickliffe Rd. Mayfield to Carlisle line, $453,000, both Graves Co.; 7.452 Leitchfield-Owensboro Rd. from Short Cr to and incl. Rough River Bridge, Hea Falls, Grayson and Ohio Counties, $187, 6.67 mi. Greenup-Russell Rd., U.S. 23, Gre up Co., $210,000; 5.324 mi. Hardinsburg Fordsville Rd. from Breckinridge Co. line Ellmitch, Ky. 261, Hancock and Ohio Counties, $115,000; 7.5 mi. Elizabethtown Bardstown Rd., Dixie Hy. and Mulberry Elizabethtown to Boston, U.S. 62, $286, 8.421 mi. Sonora-White Mills Rd. Sonora White Hills, Ky. 84, $125,000, both Hard Co.; 40.8 mi. Elizabethtown-Louisville from south of Elizabethtown to Winkler Av Louisville, Hardin, Bullitt and Jeffer Counties, $2,750,000; 10.97 mi. Hardyville Hodgenville Rd. from Canmer to Magnol U.S. 31-E, Hart and Larue Counties, $300, 5.712 mi. Robards-Tunnell Hill Rd., $65, 3.5 mi. Corydon-Rock Springs Rd., Coryd to Rock Springs, Ky. 266, $70,000; 8.22 Coryden-Dixie-Poole Rd., Corydon to We ster Co. line, Ky. 145, $115,000, all foregoi Henderson Co.; 35.243 mi. Henderson-Ma sonville Rd., U.S. 41, Henderson, Webs and Hopkins Counties, $1,615,000; 9.665 Henderson-Smith Mills-Morganfield Rd. K 136 and 259, Henderson and Union Counti $255,000; 4.575 mi. Fulton-Metropolis Rd from north of Fulgham to Carlisle Co. li Ky. 207, Hichman Co., $140,000; 20.5 road south of Louisville, Jct. with U.S. at St. Matthews to Jct. with U.S. 31 a 60 at Betheny, $1,500,000; 1.646 mi. St., Louisville, U.S. 31-W, $275,000; 6 Louisville-Taylorsville Rd. from Louisv to Jeffersontown, Ky. 155, $700,000; 10 Louisville-Taylorsville Rd. from Jeffers town to Spencer Co. line, Ky. 155, $705, 2.159 mi. 18 St. Rd. from Louisville to Helens, U.S. 31-W, $310,000; 1.4 mi. Rd., from Louisville to Berry Blvd., $204, all foregoing Jefferson Co.; 4.08 mi. Pain ville-Blaine Rd. north of Sitka town Blaine, Ky. 201, Johnson Co., $92,000; 12 mi. Wayland-Beaver Gap Rd., Ky. 7, Kno Co., $340,000; 2 mi. Barbourville-Manches Rd., Heidrick to Green Rd., Ky. 11, $115, 3.157 mi. Barbourville-Pineville Rd. 25-E, Knox Co., $410,000; 16 mi. Hodgenvil Shepherdsville Rd., Larue and Hardin Cou ties, $1,120,000; 3.3 mi. London-Mt. Vern Rd. from London to north of Pittsbo U.S. 25, Laurel Co., $200,000; 15.5 mi. L don-Barbourville Rd. near Farriston to ne Emanuel, Laurel and Knox Counti $1,075,000; 1.5 mi. bypass at Louisa Jun tion, U.S. 23 north and south of Louis

Cleaner engines, less wear, lower maintenance costs

with GULF DIESELUBE H.D.

. . . the improved heavy-duty oil for trucks and tractors

HERE'S THE OIL that sets a new standard of performance for truck and tractor service. Gulf Dieselube H.D. is especially manufactured for lubrication of automotive type Diesel engines, and for gasoline engines operating under heavy-duty conditions.

Gulf Dieselube H.D. is a quality lubricating oil of the improved detergent type — helps keep motors clean, and rings free. It holds carbon and sludge forming materials in suspension, thus preventing harmful deposits in the crankcase and on rings and pistons. It is noncorrosive to all types of alloy bearings, including copper lead and cadmium silver.

U. S. Army Specification 2-104B for heavy-duty motor lubricating oil is met in every respect by Gulf Dieselube H.D., and large quantities of this oil are being used in practically all war theaters from the Arctic to the Tropics in all types of Army motorized ground equipment—both Diesel and gasoline engines—in trucks, busses, jeeps, tanks, tractors, ambulances and other service vehicles.

This high quality oil is giving outstanding results in all types of contractors' motorized equipment, and in many commercial bus and truck fleets, Diesel powered or equipped with gasoline engines operating under heavy-duty conditions.

To get Gulf Dieselube H.D. now, write, wire, or phone your nearest Gulf office—available in 30 States, Maine to Texas.

GULF OIL CORPORATION · GULF REFINING COMPANY

GULF

Division Sales Offices:

Boston · New York · Philadelphia · Pittsburgh · Atlanta
New Orleans · Houston · Louisville · Toledo

U.S. 23, $140,000; 11.097 mi. Louisa-Paintsville Rd., $375,000, both Lawrence Co.; 0.388 mi. Seco-Jenkins Rd., U.S. 119, $134,000; 0.521 mi. Millstone-Democrat Rd., Ky. 113, $42,000; 0.25 mi. Neon City Streets, Ky. 343, $30,000; 1.25 mi. Hemphill-Beaver Gap Rd., from Hemphill to Beaver Gap, Ky. 275, $18,000, all foregoing Letcher Co.; 1.5 mi. street through Vanceburg, Ky. 10, Lewis Co., $115,000; 3 mi. Smithland-Dycusburg Rd. Tilline to Cumberland River, Ky., $48,000; 9.318 mi. Bayou-Berry's Ferry Rd., $141,000, both Livingston Co.; 2 mi. South Carrollton-Owensboro Rd. from Island to Livermore River Bridge approaches, Ky. 75, $200,000; 2.205 mi. Calhoun-Livermore Rd., Ky. 136, $80,000, both McClean Co.; 6.6 mi. relief route through Paducah, incl. spur to Ohio River Bridge, McCracken Co., $600,000; 7.758 mi. Richmond-Berea Rd., U.S. 25, Madison Co., $370,000; 6.6 mi. Lebanon-Campbellsville Rd., Ky. 55, Marion Co., $54,000; 0.366 mi. Maysville-Paris Rd., U.S. 68, $32,000; 1. mi. Forrest Ave., Maysville, Alt., Ky. 10, $41,000, both Mason Co.; 2.22 mi. Brandenburg-Louisville Rd., U.S. 60, Meade Co., $107,000; 2 mi. College St., Harrodsburg, Ky. 35, $140,000; 3.6 mi. Harrodsburg-Danville Rd. from Harrodsburg to Boyle Co. line, Ky. 35, $185,000, both Mercer Co.; 0.559 mi. Edmonton-Columbia Rd., Edmonton, Ky. 80, Metcalfe Co., $64,000; 5.608 mi. Jeffersonville-Stanton Rd., Jeffersonville Powell Co. line, Ky. 213, Montgomery Co., $105,000; 5.6 mi. Bardstown-Springfield Rd. from Bardstown to Washington Co. line, U.S. 150, Nelson Co., $310,000; 4.382 mi. Gratz-Monterey-Stamp Ground, Ky. 368, Owen Co., $165,000; 13.2 mi. Hartford-Livermore-Calhoun Rd., Ky. 136, Ohio and McLean Counties, $134,000; 7.014 mi. Falmouth-Cynthiana Rd. south of Falmouth to Harrison Co. line, U.S. 27, $415,000; 4.989 mi. Alexander-Falmouth Rd. Campbell Co. line to south of Butler, U.S. 27, $625,000, both Pendleton Co.; 2.52 mi. Hazard-Jackson Rd. from bridge at Walkerton to Duane, Ky. 15, $50,000; 1.15 mi. Hazzard City streets to Newlin to near Park St., Ky. 15, $60,000, both Perry Co.; 1.6 mi. Pikesville-Williamson Rd., U.S. 119, $80,000; 6.3 mi. Meta-Phelps Rd. from Meta East, Ky. 304, $123,000; 2.231 mi. access road to mine jct. 80, southeast of Marrowbone and exten. to store at coal mine, $58,000; 9.005 mi. Big Creek-Nolan Rd., south of Long Branch to end of bridge at Nolan, Ky. 292, $190,000; 7.165 mi. Williamson-Big Creek Rd. north of Turkey Branch to Nolan, Ky. 292, $174,000, all foregoing Pike Co.; 3.025 mi. Broadhead-Eubank Rd., Bandy to Rockcastle Co. line, Ky. 70, $119,000; 4 mi. Somerset-Mount Vernon Rd., from Elrod to Rockcastle Co. line, $185,000; 9.748 mi. Somerset-Whitley City Rd., from Burnside to McCreary Co. line, U.S. 27, $800,000, all foregoing Pulaski Co.; 6.748 mi. Mt. Olivet-Germantown Rd., from Mt. Olivet to Bracken Co. line, Ky. 165, Robertson Co., $185,000; 8 mi. Mt. Vernon-London Rd., U.S. 25, $225,000; 10 mi. Berea-Mt. Vernon Rd. from Conway to Mt. Vernon, U.S. 25, $675,000, both Rockcastle Co.; 11.6 mi. Mt. Vernon-London Rd. from Livingston to north of Pittsburg, Rockcastle and Laurel Counties, $875,000; 1.502 mi. Morehead-Owingsville Rd. from Hungry Branch to Bluestone Quarry, U.S. 60, Rowan Co., $298,000; 8.592 mi. Columbia-Albany Rd. Crocus to Sewellton, Ky. 55, Russell and Adair Counties, $360,000; 0.34 mi. Shelbyville-Eminence Rd., Shelbyville, Ky. 55, Shelby Co., $64,000; 5.764 mi. Franklin-Tennessee Line Rd. from Franklin to Tennessee Line, U.S. 31-W, Simpson Co., $330,000; 0.905 mi. street in Campbellsville from Main to High School, Ky. 55, Taylor Co., $67,000; 6 mi. Linton-Roaring Springs Rd., Ky. 164, Trigg Co., $125,000; 2.5 mi. revised route through Bowling Green, U.S. 31-W, $200,000; 3.205 mi. Bowling Green-Morgantown Rd. and underpass, Ky. 11, $180,000, both Warren Co.; 2 mi. street through Monticello, Ky. 90, $85,000; 4.064 mi. Monticello-Whitley City Rd. from Cooperesville to McCreary Co. Line Rd. 92, $162,000, both Wayne Co.; 3.5 mi. Williamsburg-Jellico Rd. Savoy to Pleasant View, U.S. 25-W, $200,000; 3.008 mi. Williamsburg-Rarbourville Rd., Ky. 11, $129,000, both Whitley Co.; 3.62 mi. roads and bridges in Danville-Shakertown Rd., Ky. 33, Boyle Co., $120,000. Financing not provided. T. H. Cutler, Frankfort, state hy. engr. CD 3/4/43, 12/24/43, 1/31/44 — ENR 3/11/43, 1/13/43, 2/10/44.

★ **Kentucky**—Dpt. Hys., Frankfort, plans completed imprv. 2.007 mi. Middlesboro-Cumberland Gap, U.S. 25-E, Bell Co., $207,000; 3.19 mi. Burkesville-Glasgow Rd., completing gap at Marrowbone, incl. street in Marrowbone, Ky. 90, Cumberland Co., $158,000; 9.228 mi. Henderson-Morganfield Rd., U.S. 60, Jct. U.S. 41, south of Henderson, Henderson Co., $220,000; 10.231 mi. Morganfield-Henderson Rd., U.S. 60, Morganfield to Highland Creek bridges, approach, Union Co., $233,000; 0.494 mi. Lancaster-Richmond Rd., Ky. 52 Lancaster, Garrard Co., $60,000; 8.664 mi. Mayfield-Brewers-Hardin Rd., Ky. 98, Mayfield to Marshall Co. line, Graves Co., $175,000; 1.914 mi. Owingsville-Morehead Rd., U.S. 60, Rowan Co., $165,000; 0.728 mi. East Main St., Providence, Ky. 85, Webster Co., $105,000; 3.158 mi. Williamsburg-Jellico

TAYLOR Spiral Pipe, though remarkably light in weight, is a real champion in all around performance.

Many of its uses in the field are well recognized. Water lines over rough country, dredge lines, jobs where pipe is to be moved and changed, are some of the ideal applications for Taylor Spiral Pipe. So well does it serve on jobs of this kind that many construction men regard Taylor Spiral as special purpose pipe and are tempted to leave well enough alone.

But this "light heavyweight" in piping doesn't rest on its laurels — far from it! The economical way it handles the everyday run of piping jobs will make you want to switch to Taylor Spiral for nearly all moderate and low pressure services—services that ordinarily have been regarded as the stronghold of time-honored Standard Thickness pipe.

As for strength — the spiral seam in Taylor Pipe actually makes it stronger than any other type of pipe, size for size and gauge for gauge. This reinforcing seam gives Taylor Spiral Pipe greater bursting strength, greater collapsing strength, greater longitudinal stiffness than even a seamless pipe of equal wall thickness.

When you plan that next piping job consider using Taylor Spiral Pipe. The savings will be mighty worthwhile and the many jobs you will find for this economical piping may surprise you.

TAYLOR FORGE & PIPE WORKS
General Offices & Works: Chicago, P. O. Box 485
New York Office: 50 Church St.
Philadelphia Office: Broad Street Station Bldg.

The Beginning of the End . . . Hitler's generals knew they were licked when Allied fighting men and equipment really got rolling. One reason the blitzkrieg idea blew up in their faces is the miracle of Allied supply lines—aided by an armada of the mightiest cargo-carrying trucks any army ever had. Hundreds of these huge 10-ton, 6 x 4 Macks helped chase Rommel out of Africa. Many more hundreds of them rolled into France on the heels of D-Day fighting men. When you think of Mack's record these past 44 years, perhaps it's not surprising that big Macks were the trucks for this big job. And it's not at all surprising that they did the job so well. Anywhere and any time—Macks really get things done.

Performance Counts!

Mack Trucks, Inc., Empire State Bldg., New York, N.Y. Factories at Allentown, Pa.; Plainfield, N.J.; New Brunswick, N.J.; Long Island City, N.Y. Factory branches and dealers in all principal cities for service and parts.

Mack

TRUCKS

ONE TON TO FORTY-FIVE TONS; BUSES, FIRE APPARATUS AND MARINE ENGINES

BUY U. S. WAR BONDS

SAUERMAN

Long Range Machines

CUT COSTS OF MOST DIG-AND-HAUL WORK

Explanation of Picture — The above picture of a small Sauerman Scraper digging gravel from pit and delivering to crushing plant shows the simple effectiveness of this method. This particular Sauerman machine consumes 4½ gals. of gasoline to move 45 cu. yd. of material per hour.

MANY jobs of digging from pit, bank or pond or of stockpiling surplus bulk materials can be simplified by using a Sauerman Power Scraper or Cableway.

This equipment is very flexible and is readily adapted to any ground conditions. First cost is reasonable, maintenance expense is small and the simplicity of operation permits easy one-man control of even the largest Sauerman installation.

There is a size and type of Sauerman machine to meet every capacity requirement from a few cubic yards an hour to many thousand cubic yards a day.

For complete data on the various sizes and types of Sauerman machines and illustrations of their uses, write for Catalog 19.

SAUERMAN BROS., Inc., 532 S. Clinton St., CHICAGO 7

Compact! Powerful! Safe!

DISTRIBUTABLE CONTROLLED POWER

with

Beebe Bros. ALL STEEL HAND HOIST — SEATTLE, U.S.A.

Money Has Been Saved on These Jobs

1200' assembled pipe (132 Tons) were lowered to bed of Mississippi at St. Paul with 9—5-Ton Beebes, three lines to each hoist through blocks.

Hudson River Bridge sidewalks were laid in sections with 32—5-Ton Beebes.

22 Beebe hoists raised, held and controlled one of world's largest tents over Mud Mountain Dam in Washington State.

★

When raising, lowering, or placing casts by power are a serious problem, the answer is the right number of Beebe Bros. All Steel Hand Hoists MANNED IN UNISON. Available in 2, 5 and 15 Ton sizes. Sold through leading dealers in all trade centers. List of dealers sent upon request.

BEEBE BROS., 2720 6th Ave. S., Seattle 4, U. S.

★

"THE STRONGEST GEARED POWER FOR ITS WEIGHT IN THE WORLD"

DRILLING CONTRACTORS

▼

CORE BORINGS
DIAMOND & SHOT CORE DRILLING
LOAD TESTS—TEST PITS

▼

THE GILES DRILLING CORPORATION

18 East 48th Street New York, N. Y.

STEAM TURBINES • HELICAL & WORM GEAR PUMPS

CENTRIFUGAL BLOWERS AND COMPRESSORS

IMO OIL PUMPS

DE LAVAL

STEAM TURBINE CO.

TRENTON 2, NEW JERSEY

POSTWAR PROJECTS (Cont'd.)

Rd., U.S. 25-W, Whitley Co., $555,000; [illegible] mi. By-Pass Rd. [illegible] ground Perimeter [illegible] liamsburg, U. S. 25-W, Whitley Co., $[illegible] 3.456 mi. Paducah-Eddyville Rd., [illegible] Smithland, New U.S. 62, Livingston Co., $162,000; 10.057 mi. Hazard-Harlan [illegible] Perry Co., $120,000. Financing not provided. T. H. Cutler, Frankfort, Ky. engr.

★ **Maryland**—State Road Comm., 100 E. Lexington St., Baltimore, plans under way Baltimore-Washington [illegible] connections to Baltimore Bridge, S.R. 1, $8,[illegible],000; Baltimore-Washington Freeway connection to Franklin [illegible] S.R. 4, $7,499,000. J. E. Greiner Co., 1201 St. Paul St., Baltimore 2, consult. engrs. CD 1/26/44—ENR 2/10/44.

★ **Maryland**—State Road Comm., 100 E. Lexington St., Baltimore, plans [illegible] completed 4-lane highway Westchester Pike, S.R.A.-4, Baltimore Co., $550,000; Williams Ave. Exten., S.R.A.-14, $778,200; resurfacing Hagerstown-Myersville Rd., S.R. 1-1, Washington Co., $361,000; Hagerstown-Myersville Rd., S.R. 1-1, $194,000; Myersville-Frederick Rd., S.R. 1-2, both Frederick Co., $[illegible] 4 lane hy., Westminster Pike, S.R. A-5, Carroll Co., $695,000; highway connection Skipton-Wye Mills, S.R. 1-12, Talbot Co., $401,000; plans 90% completed highway bridge over Tuckahoe Creek, S.R. 1-9, Talbot and Caroline Counties, $813,000; highway relocation Green Ridge, S.R. 3-1, Allegany Co., $745,000; plans 80% completed relocating road Middle Neck, S.R. A-6, Wicomico Co., $45,000; plans 75% completed highway relocation Queens Chapel Rd., S.R. 1-10, Prince George's Co., $75,000; plans 70% completed relocating highway Eckard Farms, S.R. 4, $7,499,000. J. E. Greiner Co., 1201 St. Paul St., Baltimore 2, consult. engrs. CD 1/26/44—ENR 2/10/44. Bids 2/24/44. Grading completed Marlboro By-Pass Rd., S.R. 1-10, Prince George's Co., $436,000; plans 40% completed Laurel By-Pass Rd., S.R. A-12, Prince George's Co., $286,000; Laurel By-Pass, S.R.A. 11, Howard Co., $160,000; plans 30% completed By-Pass Rd., Stevensville, S.R. 1-4, Queen Anne's Co., $605,000; plans 20% completed highway connection Ocean City, S.R. A-15, Worcester Co., $[illegible] highway connection Ocean City, S.R. A-15, Worcester Co., $25,000; plans 10% completed 6 lane hy. Martin Blvd., Baltimore Co., $1,200,000; plans under way Ellicott City By-Pass, S.R. 1-8, Howard Co., $[illegible] continuation of Ellicott City By-Pass, S.R. 3-5, Howard Co., $545,000. Financing not provided. W. T. Ballard, ch. engr. CD 1/26/44—ENR 2/10/44.

★ **Md., Baltimore**—City, City Hall, plans 30% completed imprv. Caton Ave., B.C. 3, $254,000; plans 75% completed North Ave., B.C. 6, $365,000; Race St., B.C.-24, $750,000; plans 50% completed Kane St., B.C.-[illegible] $357,000; plans 25% completed Lock Raven Rd., B.C. 18, $276,000; plans under way North Parkway, B.C. 9, $802,000; Park Heights Ave., B.C. 13, $92,000; Philadelphia Rd., B.C. 15, $270,000; Federal St., B.C. [illegible] $438,000; Echodale Ave., B.C. 19, $[illegible] Hilton St., B.C. 21, $550,000; Patterson Park Ave., B.C. 22, $147,550; Calvert St., B.C. 23, $98,000; Broening Hy., B.C. 25, $[illegible] Boston St., B.C. 26, $166,500; Woodbourne Ave., B.C. 27, $335,000; 33 St., B.C. 31, $95,000; Hanover St., B.C. 31, $378,000. Financing provided. CD 1/27/44—ENR 2/10/44.

★ **Md., Towson**—Baltimore Co., Towson, plans completed imprv. Butler Rd., 3-27, $116,590; Dixie Dr., 3-28, $7,000; Glenmore Ave., 3-29, $10,000; Kenlea Ave., 3-[illegible] $8,000; Putty Hill Ave., 3-31, $25,000; Henry Ave., 3-32, $20,000; county roads, 1-41, $150,000; county roads, northern section, 3-49, $150,000; county roads, northern section, 3-50, $50,000. Financing not provided.

Mo., Kennett—City, City Hall, preliminary plans street paving. $110,000. Russell A. Axon, 4903 Delmar Blvd., St. Louis, Mo., 8, consult. engrs.

N. Y., Fonda—Comrs. Montgomery Co., Fonda, plans under way reconstructing of roads. $172,000. State Aid Planning Funds allotted.

N. Y., Lake George—Comrs. Warren Co., Lake George, plans under way county wide road imprvs. $321,000. State Aid Planning Funds allotted.

N. Y., Rome—City, City Hall, plans under way open Pearl St., $15,000; pave Whitesboro St., $100,000; entrance to Mill St., $6,000. State Aid Planning Funds allotted.

N. Y., Schoharie—Comrs. Schoharie Co., Schoharie, plans under way road imprvs. $107,369. State Aid Planning Funds allotted.

N. Y., Watervliet—City, City Hall, plans under way parkway construction, $25,000. State Aid Planning Funds allotted.

N. Y., Woodsburgh—Village, plans under way road imprvs. $31,450. State Aid Planning Funds allotted.

★ **O., Portsmouth**—City, City Hall, streets and roads, $510,000. Financing not provided. J. F. Parkinson, Portsmouth, engr.

Ore., Corvallis—City, City Hall, new 1½ mi. main, reservoir enlargement, major repairs to distr. sys. $230,000. V. L. Goodnight, City Hall, engr.

★ **Pa., Hazelton**—City, City Hall, plans completed concrete street paving, involving 15 separate jobs, $600,000; bituminous concrete resurfacing program involving 7 separate jobs, $100,000. Financing not provided. P. Lamont, City Hall, city engr.

IN YOUR POST WAR PLANT
MODERN ENGINEERING WILL COUNT
COUNT ON THE BUTLER ENGINEER!
The BUTLER BIN Company
WAUKESHA, WISCONSIN

on ROGERS TRAILERS

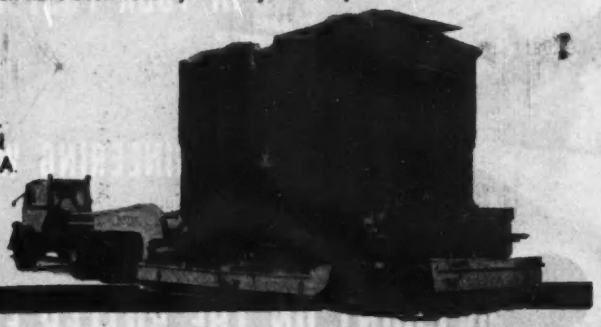
EVEN airplanes "bum a ride" on ROGERS TRAILERS in this era of high-speed, all-out industrial production.

In addition to transporting heavy machinery of all kinds on the production front, ROGERS TRAILERS are doing a tremendous job in speeding the manufacture of weapons for war.

Deck houses for Victory ships . . huge coastal defense guns . . giant tanks . . all are speeded towards completion and rushed to the fighting fronts on ROGERS TRAILERS.

It's a tough proving ground but ROGERS TRAILERS have proven their ability to "deliver the goods". New models which will be available when war contracts are completed will be even better engineered and constructed . . will "deliver the goods" more efficiently than the thousands which have been used by industry for many years.

EXPERIENCE *builds 'em*
PERFORMANCE *sells 'em*



ROGERS BROS. CORPORATION
ALBION - PENNA.

MacArthur

35 YEARS INSTALLING PILES
OF EVERY TYPE

CAST-IN-PLACE CONCRETE COMPOSITE
STEEL SECTIONAL PIPE TIMBER

SOIL AND ROCK EXPLORATION

MacARTHUR CONCRETE PILE CORPORATION
18 EAST 48th STREET, NEW YORK 17, N. Y.

POSTWAR PROJECTS (Cont'd.)

★**Pa., Phila.**—City, Dpt. P. Wks., City Hall, plans 90% completed improv. Vine St. approach to Delaware River, Proj. WE 94-J, $3,300,000; plans 85% completed improv. Roosevelt Blvd., Broad St. to county line, Proj. 85-J, $4,600,000; plans 75% completed improv. Industrial Highway, Proj. WE 93-J, $2,000,000; Industrial Highway, Proj. WE 87-J, $2,000,000; city-state highways, Proj. WE 105-J, $2,500,000; Proj. WE 99-J, $2,107,000; Proj. WE 97-J, $1,750,000; Proj. WE 95-J, $1,750,000; Proj. WE 94-J, $1,750,000; Proj. WE 92-J, $1,750,000; Proj. WE 89-J, $1,750,000; Proj. WE 86-J, $1,750,000; Proj. WE 85-J, $1,750,000; Proj. WE 83-J, $1,750,000; Industrial Highway, Proj. WE 96-J, $2,000,000; Proj. WE 95-J, $2,500,000; Proj. WE 93-J, $2,000,000; Financing available on foregoing projects; plans 25% completed completion contract in vicinity of City Hall, Proj. Ct. 1, $182,500; city projects related to Penna. R. R., terminal imprvs., Proj. WE 81, $1,250,000; Proj. WE 80, $2,250,000; Proj. WE 79, $3,200,000; Proj. WE 83, $2,567,000; Proj. WE 82, $2,250,000. Financing not provided on foregoing projects. Thos. Buckley, City Hall, city engr.

★**S. C., Columbia**—Richland Co., Columbia, surface treatment, sidewalks, curb and gutter, etc. approx. 85 mi. roads and streets, $2,672,000. O. H. Joyner, Court House, engr.

S. D., Aberdeen—Brown Co., Aberdeen, plans 50% completed 12 mi. road, one 26 ft. bridge, $100,000. Land rights not cleared, financing not provided. G. Newharth, Aberdeen, co. hy. engr.

Tex., Highland Park (mail Dallas)—Town, 4700 Drexel Dr., Highland Park, Dallas, Zone 5, plans 75% completed bituminous macadam alley paving, $27,400; asphaltic concrete street resurfacing, $123,600. Rollins & Forrest, Praetorian Bldg., Dallas, Zone 1, consult. engrs. R. B. Thomas, 4700 Drexel Dr., Highland Park, Dallas 5, engr. CD 9/28—ENR 10/19.

Tex., Laredo—City, City Hall, street widening, paving, bridge approaches, etc. $56,000. Financing not provided. F. C. Heins, Box 562, city engr. CD 1/10—ENR 1/25.

Tex., Plainview—City, City Hall, curbing, guttering, compacted subgrade, caliche base, 2 course inverted penetration topping, $156,000. W. J. Williams, Box 1272, consult. engr.

Vt., Rutland—City, City Hall, plans 25% completed concrete streets, $75,000. Financing not provided. W. V. Kallio, City Hall, city engr. CD 5/26—ENR 6/15.

★**Va., Charlottesville**—City, Box 198, plans 80% completed general street imprvs. $500,000. S. Burnley, City Hall, city mgr.

Va., Lynchburg—City, Box 60, City Hall, plans 50% completed stone macadam highway with concrete curb and gutter through city as proposed belt line, widen existing U.S. Highway to 40 ft., incl. installing concrete curb and gutter and stone macadam paving, $250,000. J. D. Wright, City Hall, acting city engr. and dir. state Hy. Dpt., Richmond, consult. engr.

Va., Suffolk—City, J. C. Causey, Jr., mgr., City Hall, plans 75% completed concrete curbing and guttering, Hall Ave. from Caroline Ave. to Cullodan St., $53,180. M. A. Sturgeon, 802 National Bank of Commerce Bldg., Norfolk, consult. engr. E. W. Richards, Municipal Bldg., city engr.

Wash., Longview—City, City Hall, financing provided but plans incomplete, city-wide street imprvs., $95,000. J. Jones, City Hall, city engr. CD 12/6—ENR 12/28.

W. Va., Fairmont—City, City Hall, street and road construction, $146,000. S. A. Shuttleworth, City Hall, city engr.

★**W. Va., Morgantown**—City, 389 Spruce St., plans 75% completed constructing urban streets, Class H, city-wide, $1,497,700; street widening and pavement, University Ave., $211,482. Land rights not cleared, legal obstacles to be overcome, financing not provided. H. Boyles, 389 Spruce St., Planning Bd. engr.

Wis., Eau Claire—City, City Hall, plans 10% completed resurfacing streets, $161,000. A. R. Garnock, City Hall, city engr.

Wis., Green Bay—City, City Hall, plans 10% completed paving various streets, $350,000. Financing not provided. F. J. Steeno, City Hall, city engr.

Wis., Madison—City, J. R. Law, mayor, City Hall, plans completed repaving Johnson St., $48,000. Financing not provided. T. F. Harrington, city engr.

★**Wis., Madison**—City, J. R. Law, mayor, City Hall, plans underway widening S. Park St., $152,000; E. Washington St., $170,000; W. Washington St., $97,000; repaving Broome St., $28,000; Wisconsin St., $59,000; Williamson St., $125,000; W. Washington St., $64,000; widening Regent St., $54,000. Financing not provided. T. F. Harrington, City Hall, city engr.

Wis., South Milwaukee—City, City Hall, plans completed black top and imprv., regrade, etc., streets, $60,000. Financing not provided. O. McCann, City Hall, city engr.

Wis., Wauwatosa—City, City Hall, plans 30% completed 50% new concrete and 50% bituminous surfacing streets, $200,000. Financing not provided. M. F. Linnan, City Hall, engr.

U.S. ROYAL *CON-TRAK-TOR* NOW STRONGER THAN EVER

A favorite off-the-road traction tire for construction jobs, strip-mining and excavating, the U.S. Royal Con-Trak-Tor is now stronger than ever. Extra-strength, extra-gauge rayon cords, safety-bonded together, give long tire life even on the *tough* jobs.

But whatever the job, today new tires are scarce. Look after your present tires, keep them rolling to the last safe mile. Make every tire mile count toward victory.

U.S. TIRES

IN EVERY SERVICE U. S. TIRES EXCEL

Listen to "Science Looks Forward"—new series of talks by the great scientists of America—on the Philharmonic-Symphony program, CBS network, Sunday afternoons, 3:00 to 4:30 E.W.T

SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

1230 SIXTH AVENUE • ROCKEFELLER CENTER • NEW YORK 20, NEW YORK

SUPER-VULCAN
OPEN TYPE
DIFFERENTIAL-ACTING
PILE HAMMERS

18C, 30C, 50C and 80C

• There's a lot of hitting power in compact form in the Super-VULCAN and it means that once a pile driving job gets underway the completion is bound to be on schedule or better.

Twice the blows per minute than ordinarily possible is one answer to this speed. The simple design and rugged strength means that the Super-VULCAN stays on the job. The positive action is another speed producer as is ease of operation.

The Super-VULCAN uses ¼ to ⅓ less steam per blow. The open type fits the same leads and uses the same accessories as the VULCAN Single-Acting Pile Hammer.

Sizes
18C—30C—50C—80C
meet all needs

•

VULCAN IRON WORKS
331 North Bell Avenue
Chicago 12 --- Illinois

POSTWAR PROJECTS (Cont'd.)

READY FOR BIDS

Kan., Lawrence—Douglas Co., Lawrence, plans completed grading (fill) and surfacing and (2) equalizing structures (pile trestles). $26,000. E. E. Larson, Court House, co. engr.

★**Md., Baltimore**—City, City Hall, plans completed Impvt. Race St., B.C. 1, $321,500; 25 St., B.C. 2, $180,000; Druid Park Dr., B.C. 4, $62,000; Chase St., B.C. 5, $286,000; Hillen Rd., B.C. 7, $89,500; Race St., B.C. 9, $200,000; Cold Spring Lane, B.C. 11, $186,500; Lock Raven Rd., B.C. 15, $75,000. Financing available. CD 1/27/44—ENR 2/10/44.

Md., Hagerstown—City, City Hall, plans completed concrete alleys, macadam and concrete surfaced streets and curbs, drainage, etc. $120,000. C. W. Stumpp, City Hall, city engr.

Va., Suffolk—City, J. C. Causey, Jr., mgr., City Hall, plans completed, curbing, guttering, sidewalks, binder and sand asphalt on concrete widening 2,000 ft. W. Washington St. from Pitchkettle Rd. to West Corporate Limits, $51,755; 2,200 ft. Caroline Ave. from Hall to Kilby Aves., $68,400; curbing, guttering, sidewalks, concrete paving 1,000 ft. County St. from E. Washington St. to Johnson Ave., $36,760. M. A. Sturgeon, 802 National Bank of Commerce Bldg., Norfolk, consult. engr. H. W. Richards, City Hall, city engr.

EARTHWORK, WATERWAYS

PROPOSED WORK

★**California**—U. S. Eng., 751 S. Figueroa St., Los Angeles, Zone 14, plans San Juan Flood Control Dam and Basin on Santa Ana River, Orange Co. $3,000,000.

Calif., Fresno—City, City Hall, Dry Creek canal lining, $50,000.

★**Calif., San Francisco**—City and San Francisco Co., City Hall, Proj. 2202, Tideland reclamation, $2,000,000; Proj. 1443, Sharp Park bulkhead, $45,000; Proj. 1445, Lincoln Park irrigation sys., $200,000; Proj. 1463, Harding Park irrigation sys., $80,000.

Calif., San Francisco—City and San Francisco Co., City Hall, five following postwar years, Proj. 42, channelization Junipero Serra Blvd., $123,000; Proj. 43, Alemany Blvd., $231,550, for Bureau of Engineering, Hall of Justice.

†**Me., Hendricks Harbor**—U. S. Eng., 31 St. James Ave., Boston, dredging harbor, $6,000. Financing not provided.

Nev., Reno—City, City Hall, masonry river wall along North bank of Truckee from Sierra St. to bridge at Idlewild Park, $50,000.

Va., Newport News—City Council, City Hall, preliminary plans boat harbor impvts. (bulkhead and dredging), $350,000. Financing not provided.

Wis., Madison—City, City Hall, constructing lock basin outlet of Lake Mendota, $50,000. Financing not provided.

★**Alberta** — Prairie Farm Rehabilitation Admin., Regina, Sask., about 75,000 acres Medicine Hat irrigation development between Vauxhall and Medicine Hat, $650,000.

★**Alta., Calgary**—Prairie Farm Rehabilitation Admin., Reginia, Sask., St. Mary-Milk River water development irrigating approx. 345,000 acres in southwestern Alberta, $15,000,000.

Alta., Cardston—Provincial Govt., Edmonton, irrigation project serving 8,000 acres, $185,000.

Alta., Stavely—Provincial Govt., Edmonton, storage reservoir on Willow Creek, $75,000.

★**Manitoba**—Province of Manitoba, c/o Ministry of Mines & Resources, Winnipeg, canal and control dam providing for control of flow from Lake Winnipegasis into Lake Manitoba, Meadow Portage, Dauphin District, $2,000,000; preliminary plans prepared dams across 2 main channels of Nelson River $3,000,000, development 250,000 h.p. at site about 3 mi. from point where Dauphin River enters Lake Winnipeg over $15,000,000, both in Winnipeg; drainage scheme in Hazel Creek area east of Vivian and between Dawson Road and main line of Canadian Pacific R.R., 194,500 acres in Vivian, $329,000; reclamation project comprising 71,000 acres, Lac du Bonnet, Springfield District, $75,000; enlarging channel of Winnipeg River and constructing control dams at outlet of Lac du Bonnet, Springfield Dist., $350,000.

Man., Riverton—Provincial Govt., Winnipeg, reclamation project, 74,000 acres, in Washow Bay area, along west side Lake Winnipeg. $125,000.

Man., Souris—Prairie Farm Rehabilitation Admin., Regina, Souris River development irrigating about 10,000 acres in Souris River Valley of southeastern Saskatchewan, $120,000.

★**Saskatchewan**—Prairie Farm Rehabilitation Admin., Regina, South Saskatchewan Ou Appelle River development, irrigating about 30,000 acres in Central Saskatchewan, incl. Regina and Moose Jaw, $1,150,000.

PLANS UNDER WAY

Calif., Burlingame—City, City Hall, drainage project, involving diversion Burlingame Creek down Lorton Ave. to Believue Ave. and under railway tracks, $75,000. C. Lawson, City Hall, city engr.

Me., Canton—City, flood protection work incl. either earthen levee or seawall, $170,00. Russell & Axon, 4302 Delmar Blvd., St. Louis, Zone 8, consult. engrs.

Neb., Scottsbluff—City, E. I. Mead, mayor, City Hall, tile Winter Creek canal, passing through corner of city, $35,000. Harold Hoskins & Associates, 622 Terminal Bldg., Lincoln, consult. engrs.

N. Y., Rome—City, City Hall, plans under way dam on Point Rock Creek. $30,000. State Aid Planning Funds allotted.

Wis., Wauwatosa—City, 7616 Harwood Ave., retaining wall along river, $40,000. Financing not provided. M. F. Linnan, City Hall, engr.

★**Man., Cedar Lake (The Pas Postal District)** — Provincial Govt., Winnipeg, excav. diversion channel from Cedar Lake to Lake Winnepegosis and necessary control dam, $4,000,000; constructing dam at outlet of Cedar Lake, diverting high water flows of Saskatchewan River into Lake Winnipegosis. $1,000,000. Dpt. Mines & Natural Resources, Winnipeg, engr.

PUBLIC BUILDINGS

PROPOSED WORK

Calif., Exeter—Exeter Memorial Hospital Assn., Exeter, hospital. $150,000.

★**Calif., Folsom**—State Div. Architecture, Public Works Bldg., Sacramento, kitchen, mess hall, $425,000; segregation bldg., shops, laundry, $427,000; industrial bldg., $98,000; altering other bldgs., $250,000; maintenance engineering shops, $60,000, all at Folsom Prison. CD 10/11/43—ENR 10/14/43.

Calif., Fresno—City, City Hall, city hall annex, $350,000; 8 fire houses, $45,000.

†★**Calif., Fresno**—Veteran's Admin., Vermont Ave. between H and I Sts. N.W., Wash. 25, D. C., 460-bed veterans hospital, $2,000,000.

★**Calif., San Francisco**—City and San Francisco Co., City Hall, first postwar year, Proj. 60, Civil Courts bldg., $300,000; five following years, Proj. 64, warehouse for voting machines $177,500; Proj. 59, yards, office and shops, Maintenance Bureau $839,500, for Bureau Architecture.

Calif., San Francisco—City and San Francisco Co., City Hall, five following years after first postwar year, Proj. 903, 4, repair shop and warehouse $258,000; Proj. 905, Tower rehabilitation $52,500; Proj. 907, society quarters and offices $55,000; Proj. 908, West Wing exten. $25,000, for De Young Museum, Golden Gate Park.

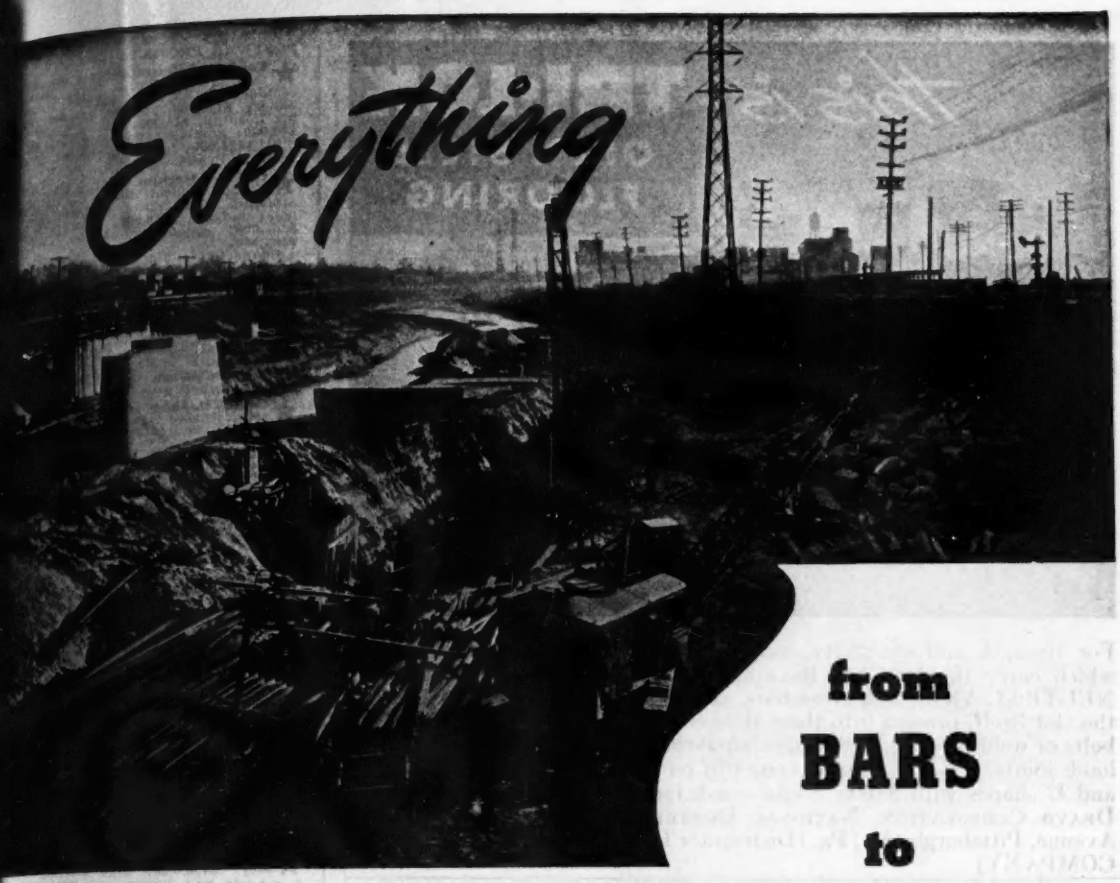
★**Calif., San Francisco**—City and San Francisco Co., City Hall, five following years after first postwar year, Proj. 1010 High Pressure sys. (part) $224,000; Pro. 1001, headquarters bldg. $375,000; Proj. 1002, 3 engine houses $689,000; Proj. 1003, 5 engine houses $383,000; Proj. 1005, 1 engine house $81,400; Proj. 1007, repairing 16 engine houses $355,000; Proj. 1008, repairing 8 engine houses $90,000 for Fire Dpt., City Hall. CD 3/22/43—ENR 3/25/43.

★**Calif., San Francisco**—City and San Francisco Co., City Hall, five following years after first postwar year, Proj. 1102, academy and training grounds $235,000; Proj. 1101, headquarters bldg. $1,900,000 for Police Dpt., Hall of Justice. CD 3/22/43—ENR 3/25/43.

Calif., San Francisco—City and San Francisco Co., City Hall, first postwar year, Proj. 801, Marina Branch $60,000; Proj. 802 North Beach Branch $60,000; Proj. 803, Outer Sunset Branch $60,000; Proj. 804 Ingleside Branch $60,000; five following years Proj. 805, Excelsior Branch $22,300; Proj. 806, Potrero Branch $22,300; Proj. 808, Richmond-Presidio Branch $22,300; Proj. 809, Park-Merced Branch $22,300; Proj. 810, Bayview Branch $24,100; Proj. 811, Parkside Branch $24,100; Proj. 812, Portola Branch $24,100; Proj. 813, Glen Park Branch $24,100; Proj. 816, Alamo Square Branch $60,000 for Public Library, Civic Center. CD 3/22/43—ENR 3/25/43.

★**Calif., San Francisco**—City and San Francisco Co., City Hall, five following years after first postwar year, Proj. 1219, San Francisco Hospital maintenance and repair $125,000; Proj. 1203, remodeling Laguna Honda Home $141,000; Proj. 1218, emergency hospital and center, Richmond Dist. $130,000; Proj. 1220, emergency hospital and center, Bayview Dist. $130,000 for Pub. Health Dpt., 101 Grove St. CD 3/22/43—ENR 3/25/43.

★**Calif., San Francisco**—City and San Francisco Co., City Hall, first postwar year, Proj. 1605, Ping Yuen $1,150,000; five following years, Proj. 1601, De Haro Plaza $673,000; Proj. 1602, Bernal Dwellings $950,000; Proj. 1603, Glen Crags $600,000; Proj. 1604, North Beach Place $1,607,000; Proj. 1606, Hunters View $730,000, for San Francisco Housing Auth., 525 Market St.



from BARS to SHEET PILING

at's what road builders will be able to obtain from Bethle-
n warehouses when unrestricted building is resumed, as
y did before the war. Contractors have found that it pays
make Bethlehem headquarters for all steel products used
building highways, streets, roads and highway bridges.
me, money and trouble can be saved by choosing needed
oducts from Bethlehem's complete line, and obtaining
em on a single order.

Whatever road steel products you need—bars, pipe, mesh,
d joints, wire rope, steel highway guards and posts, piling
either retaining or load-bearing structures, or any other
m listed below—you'll find that Bethlehem products are
rdy and reliable. They're designed and built for rugged
rformance.

Post-war highway projects are now rapidly shaping up.
t Bethlehem help you get going fast when the word is
ven. For full information about Bethlehem road steel and
ied products, get in touch with the nearest district office,
write direct to Bethlehem Steel Company, Bethlehem, Pa.

OTHER BETHLEHEM PRODUCTS FOR HIGHWAYS

d Joints Dowels Dowel Bar Supports Center Strip
Wire Rope and Strand Bar Ties Guard Rails
rbor Rods Right-of-Way Fence and Posts Pipe
Hollow Drill Steel Digging Bars Structural Steel
Reinforcing for Concrete Pipe
ridge Floor Reinforcing Corrugated Sheets
ncrete Slab Spacers Turnbuckles
Tie Rods, Spikes, Bolts and Nuts
Highway Guard Posts and Brackets
mber Bridge Hardware Sheet and H-Bearing Piling

BETHLEHEM STEEL

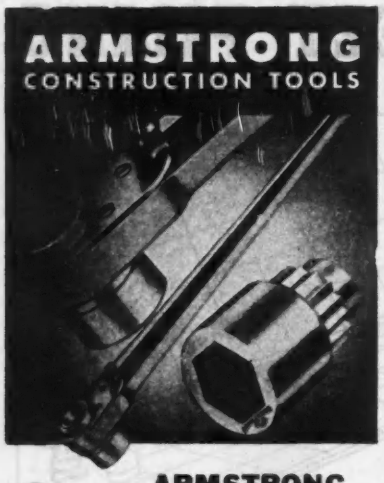
NEW FOLDING BAR MAT

For convenient handling and stockpiling in wide widths, Bethlehem has developed a new hinged reinforcing-bar mat which folds over double. Made like the regular bar mat, of deformed bars clipped together, it is easier to truck, and can be handled by two men. It is less likely to be damaged in handling, is readily installed, and lies flat.

Bethlehem reinforcing bars, plain and deformed, are made of new billet steel in standard sizes and grades, and can be bent to shape and cut to size in most Bethlehem warehouses.

For strength and simplicity, only two parts are used — bearing bars which carry the load and have curved slots punched ABOVE THE NEUTRAL AXIS, and cross bars, of the same cross sectional area as the slot itself, pressed into these slots to distribute the load. No.rivets, bolts or welds are required, thus eliminating the possibility of loose joints. Tri-Lok flooring comes in rectangular, diagonal and U shapes with Safety Steps — ask for Bulletin 1140 — DRAVO CORPORATION, NATIONAL DEPARTMENT, 300 Penn Avenue, Pittsburgh (22), Pa. (Distributor for THE TRI-LOC COMPANY)

DRAVO



ARMSTRONG
DROP FORGED CONSTRUCTION RATCHETS

The ARMSTRONG Reversible Ratchet Construction Wrenches are made of steel, thruout—the Ratchets are drop forged, the Nut Socket machined from special analysis bar steel. All parts except the handle are hardened. The spindle of the Ratchet is of "wide open" design—permits bolt to pass thru the Ratchet so that nuts can be run any distance along bolt and securely set with one setting. 24" or 36" Ratchets take square or hexagonal sockets for nuts of from 1" to 2⅝" dia. or 1⅜" to 3⅛" dia., respectively.

Write for Catalog

ARMSTRONG BROS. TOOL CO.
"The Tool Holder People"
356 N. FRANCISCO AVE. CHICAGO, U.S.A.
Eastern Warehouse & Sales, 199 Lafayette St., New York

LEWIS & McDOWELL Inc.

Engineers & Contractors

GUNITE work in all its Branches
Prestressed Gunite Tanks
Waterproofing, all types
Restoration of Masonry Buildings
Synthetic Rubber and other special Tank Lining.
Dam Repairs and Reconstruction

285 Madison Avenue, New York, N. Y.
Murray Hill 3-0554

Diamond Core Drilling Contractors

FOUNDATION TESTING
Dams, Heavy Structures, etc.
STAGE SECTIONAL PRESSURE GROUTING
Contract or Rental

MFR'S DIAMOND & SHOT CORE DRILLS GROUT MIXING MACHINES, PACKERS AND GROUT PUMPS.

MOTT CORE DRILLING CO.
HUNTINGTON, W. VA.

POSTWAR PROJECTS (Cont'd.)

★**Calif., San Quentin**—State Div. Archi... ture, Public Works Bldg., Sacramento, remodeling kitchen, $15,000; bakery, $200,000; hospital, $225,000; ... ing hospital, $15,000; fencing, guard ... $40,000; administration bldg., $150,000; ... mill, $425,000; reservoir, $106,000, all at ... Quentin Prison.

★**Calif., Stockton**—City, c/o Stockton Unified School Dist., City Hall, ... Stockton High School, $972,000; junior ... lege bldgs., $756,000; ... $351,000; school in Country Club ... $262,440.

Connecticut—State, Wm. J. Cot... comr., State Office Bldg., Hartford, ... for educational displays along site of ... ritt Parkway. $155,000. Financing ... provided.

★**Conn., Bristol**—City, K. A. Reiche, ... Schools, Bd. Educ., Mary A. ... School, East Bristol, $150,000; school ... placing South Side School, School St., ... 000; Farmington Ave. School, $250,... Financing not provided.

★**Conn., Danbury**—State Bd. Educ., Hartford, State Teachers College ... $...,000,000.

Conn., Danbury—Bd. Educ., Danbury, brick, steel trade school, $250,000. Financing not provided.

Conn., Hamden—Town, Bd. Selectmen, Town Hall, plans bond election, brick, ... school, $250,000. Financing not provided.

Conn., Hamden—State, Gov. R. E. Baldwin, State Capitol, Hartford, brick, ... state armory, $250,000. Financing not provided.

Conn., Milford—Town, Bd. Selectmen, Town Hall, brick, steel armory. $... Financing not provided.

Conn., New Britain—State, Gov. R. E. Baldwin, State Capitol, Hartford, brick, ... stone state armory, $250,000. Financing ... provided.

Conn., New London—State, Gov. R. E. Baldwin, State Capitol, Hartford, brick, ... state armory, $250,000. Financing not provided.

Conn., Norwalk—City, Mayor's Office, City Hall, plans $200,000 bond issue, Veterans Memorial Bldg., Mathews Park. CD 2/18, ENR 2/9.

Conn., Putnam—State, Gov. R. E. Baldwin, State Capitol, Hartford, brick, ... state armory, $250,000. Financing not provided.

★**Ia., Des Moines**—Bd. Educ., G. Carr, secy. $4,500,000 bond election Mar. ... 9 schools and imprv., rebuilding 12 other schools.

Me., Gardiner—City, Mayor Hubbard, City Hall, city hall, over $150,000; high school, over $150,000. Financing not provided.

Md., Cheltenham—State, Annapolis, dormitory, kitchen and dining unit, receiving unit, apartments, cottages, at Cheltenham School for Boys, $377,194. Financing not provided.

★**Md., College Park**—University of Maryland, College Park, engineering laboratory, $320,000; office for College of Agriculture, $360,000; auditorium, $375,000; laundry and storage, $50,000; 4 greenhouses, $40,... Financing not provided.

Md., Frostburg—State, Annapolis, alterations college bldgs., at Frostburg State Teachers College. $175,000. Financing not provided.

Md., Laurel—Prince George's Co., Upper Marlboro, school, 16-17, $203,000; school near here, 16-18, $203,000. Financing not provided.

Md., Lonaconing — Municipality, school, 1-1, $350,000. Financing not provided.

Md., Mount Savage—Municipality, school, 1-2, $350,000. Financing not provided.

Mass., Leominster—City, Wm. B. Appleton, Supt. Schools, City Hall, Senior High School and gymnasium. Over $... Financing not provided.

Mass., Waltham—City, Supt. Schools, City Hall, Cornelia Warren School addn., Bear... St. Over $150,000. Financing not provided.

★**Mich., Ypsilanti**—Michigan State Hospital Comn., Lansing, 250-bed, brick, steel, stone and concrete hospital addn., $535,000.

★**Mont., Warm Springs**—Montana State Hospital, Warm Springs, 4 dormitories, $2,000,000. ($475,000 available.)

★**N. Y., Brooklyn**—Bd. Educ., 49 Flatbush Ave. exten., Brooklyn, Zone 1, P.S. 229 addn., Proj. E-390, $262,500; P.S. ... addn., Proj. E-317, $262,500; P.S. 485 addn., Proj. E-485, $262,500; P.S. 199 addn., Proj. E-527, $220,500.

N. Y., Brooklyn—Bd. Higher Educ., City Park Ave., New York, Zone 21, library addn., Brooklyn College, Bedford Ave. and Avenue H, Zone 10, Proj. HN-38. $250,...

★**N. Y., Brooklyn**—Dpt. P. Wks., Municipal Bldg., New York, Zone 7, Gravesend Health Substation A, Proj. HL-21, $150,... Flatbush Health Substation, Proj. HL-... $150,000; Sunset Park Health Substation, Proj. HL-25, $150,000; Fort Greene Health Substation, Proj. HL-5, $150,000, for Dept. Health, 125 Worth St., New York, Zone 1...

AR PROJECTS (Cont'd.)

, New York—Dpt. P. Wks., Municipal
Zone 7, Fordham Health Subestation,
HL-10, $150,000; Westchester Health
Proj. HL-12, $150,000; Pelham
Substation, Proj. HL-31, $150,000, for
Health, 125 Worth St., New York.
13.

Y., New York—Dpt. P. Wks., Munici-
Bldg., Zone 7, Central Bakery, Proj.
$200,000; Kitchen Bldg., Proj. C-54,
; power house and service tunnel al-
Proj. C-55, $172,500; receiving
Proj. C-56, $46,000; edu-
for laundry, Proj. C-53, $500,000, all at
bldg., Proj. C-26, $500,000, all at
Island, for Dpt. of Correction, 100
St., Zone 13.

Y., New York—Bd. Educ., 49 Flat-
Ave. exten., Brooklyn, Zone 1,
addn., Proj. E-526, $230,250; P.S.
addn., Proj. E-484, $220,500; P.S. 119
addn., Proj. E-483, $262,500; P.S. 108 addn.,
Proj. E-1, $265,800, all in Bronx Boro.

C., Greensboro—City Council, Wm. H.
Sullivan, mayor, created Greensboro
rial Fund Comm., for World War II
rial auditorium. $750,000. Financing
rovided.

a., Ada—Bd. Affairs, Capitol, Oklaho-
City, science bldg., at East Central
Teachers College, $300,000. Legal ob-
to be overcome and financing not
ded.

a., Alva—Bd. Affairs, Capitol, Okla-
City, science hall at Northwestern
Teachers College, $300,000. Financing
rovided.

a., Edmond—Bd. Affairs, Capitol, Okla-
City, class room bldg., at Central
Teachers College, $300,000. Financ-
ot provided.

a., Lawton—Bd. Agriculture, Capital,
homa City, men's dormitory at Cameron
ol of Agriculture, $200,000. Financing
rovided.

a., McAlester—Bd. Affairs, Capitol,
homa City, ward bldg., at State Peni-
ary, $200,000. Financing not provided.

a., Norman—Bd. Affairs, Capitol,
homa City, ward bldg., at Oklahoma
Hospital for Insane, $200,000. Financ-
not provided.

Okla., Norman—University of Oklaho-
a, Norman, men's dormitory, $500,000;
en's dormitory, $600,000; new physical
ation bldg., $450,000; fine arts bldg.,
,000; press bldg., $150,000; home eco-
ics bldg., $275,000. Financing not pro-
d.

Okla., Stillwater—Bd. Agriculture, Capi-
ol, Oklahoma City, women's dormitory,
,000; men's dormitory, $500,000, both at
M College. Financing not provided.

kla., Vinita—Bd. Affairs, Capitol, Okla-
City, addnl. ward bldg. at Eastern
homa State Hospital, $150,000. Financ-
ot provided.

Ore., Portland—Oregon State Guard,
Salem, armory, $2,500,000.

re., Salem—State Bd. Control, Salem,
block at State Penitentiary, $120,000;
age for 10 patients, $93,000, employees
mitory, $150,000, and cold storage bldg.,
,000, at Fairview Home for Children.
ancing not provided.

re., Woodburn—State Bd. Control, Salem,
ol, $120,000; 2 dormitories, one $50,000
other $40,000, at State School for De-
ent Boys. Financing not provided.

Pa., Arnold—H. S. Holste, supt. Arnold
Public Schools, City Hall, high school,
,000.

a., Drexel Hill—Delaware County Hospi-
Dr. T. Conway, Jr., pres. Bd. Trustees,
ge H. L. Ervin, campaign chn., hospi-
$200,000. Financing not provided.

C., Columbia—Richland Co., Columbia,
s completed by Lafaye, Lafaye & Fair,
Sumter St., library, $350,000.

Tenn., Knoxville—City, City Hall, gen-
eral hospital addn., $1,500,000; high
ol, $1,000,000; technical school, $500,000;
ary, $300,000; auditorium, $750,000.

Tex., Austin—State Bd. Control, Austin,
bldg. for Texas School for Blind,
,000; Texas School for Deaf, $265,946;
ows at State Dairy and Hog Farm,
fencing, drainage, storage facilities,
$82,444; bldgs. for Austin State School,
,231; bldg. at farm colony, $150,000;
s for Austin State Hospital, $750,654;
for deaf, dumb and blind, $150,000.
ancing not provided.

Tex., Burnet—State Bd. of Control, Capi-
Bldg., Austin, converting CCC camp
s into State Hospital for mental pa-
nts, $150,000. Financing not provided.

Tex., Greenville—City, City Hall, voted
,000 bonds, high school and site.

Tex., San Antonio—Harlandale Inde-
pendent School Dist., Gerald Ave., San
tonio, high school, $200,000; intermediate
ol, $150,000; school, $150,000, all in
rlandale suburb. Financing not provided.

Tex., San Augustine—City, City Hall,
nicipal hospital, $150,000. Funds avail-
. CD 12/31/44—ENR 1/11/44.

Va., Lynchburg—City, Dpt. P. Wks. &
School Bd., City Hall, high school,
,000. Land rights not cleared, legal
acles to be overcome and financing not
vided.

Modern TRACTORS can do more work!

● Our giant modern tractors, delivering tremendous horsepower, have made possible our huge earth moving equipment. Massive tools of peace-time construction, they became effective weapons of war. The engineers of many industries contributed to this modern tool. Better materials, better processes, better design all help to build present day tractors.

Modern Lubricants keep them at work

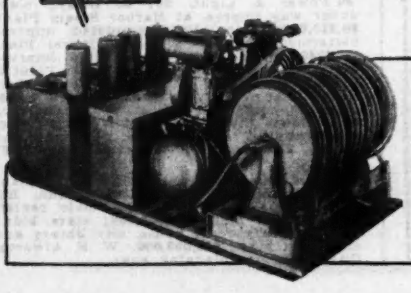
Petroleum engineers are making their contribution to the work of these great machines. It takes good lubricants and oil to keep the bearings rolling and the gears moving. For without lubrication machines cannot work. Modern lubricants keep machines at work . . . They reduce maintenance . . . prolong life and cut production costs.

GRACO Equipment delivers the Lubricants

Graco equipment delivers the various types of grease, with the proper pressures to assure correct results. It's the basic contribution of Graco engineers to the job of keeping machines at work.

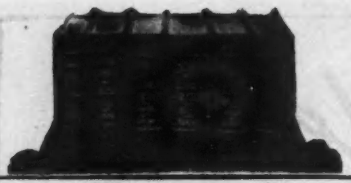
Write for Catalog No. 174

GRAY COMPANY, INC.
Minneapolis 13, Minnesota



GRACO

GRACO
CONVOY LUBERS



Try them on your toughest problems

FOR YEARS the Hool and Kinne Library has been providing structural engineers with the facts they need *on every problem concerned with the design and construction of civil engineering structures.*

Now available in a new, up-to-the-minute Second Edition

All six volumes have been newly revised, and tables, diagrams, formulae, reference data, have all been brought up to date, in line with recent standards and practices.

HOOL AND KINNE'S

STRUCTURAL ENGINEERS'

Handbook Library

6 volumes, 3575 pages, fully illustrated

THESE six books offer you the most complete compilation of structural engineering data ever published; they furnish you with genuinely professional information drawn from records of actual practice and written by a large staff of specialists.

This fine library

—**COVERS** the how and why of foundation and substructure design and construction, the general theory of structural members, the detailed design of such members and the design of their connection with other members

—**EXPLAINS** the principles of statics, reactions, moments and shears in beams and trusses, influence lines, methods of computing stresses in lateral trusses and portal bracing

—**GIVES** details of design and construction of steel, timber, and concrete structures of all types

This is a library that must be USED to be fully appreciated—that is why we want YOU to use it. We want you to forget the financial side of this proposition until you have solved some knotty problem that you may be up against—to find out how a specialist in that particular field would handle it. We want to prove to you that this library furnishes you with what amounts to the consulting services of 54 recognized structural engineering specialists.

Examine the Library for 10 days in your home or office

.....SEND THIS McGRAW-HILL COUPON.....

McGraw-Hill Book Co., 330 W. 42 St., New York 18

You may send me Hool and Kinne's Structural Engineers' Library for my inspection. If the books prove satisfactory, I will send $3.50 in 10 days and $3.00 per month until I have paid the price of the books, $27.50. If the books are not what I want, I agree to return them postpaid within 10 days of receipt.

Name .....

Address .....

City and State .....

Company .....

Position .....

(To insure prompt shipment write plainly and fill in all lines.) NR. 2-22-45

POSTWAR PROJECTS (Cont'd.)

Va., Newport News—City Council, City Hall, plans white recreation bldg., $125,000; colored recreation bldg., $175,000. Financing not provided.

★**Va., Newport News**—City Council, City Hall, preliminary plans Colored Library, $115,000; court house, $350,000; jail addn., $200,000; city hall, $400,000; 3 homes for guards, $15,000; Junior High School, $354,000; Marshall Courts School, $241,500; city home and hospital, $225,000. Financing not provided.

★**Va., Newport News**—City Council, City Hall, preliminary plans Stuart Gardens School, $254,000; Marshall Courts School, $221,500. Financing not provided.

★**Wash., Spokane**—State Dept. Finance. M. C. Wallgren, gov., Olympia, armory and civic auditorium, $900,000.

★**Wis., Madison**—City, J. R. Law, mayor, City Hall, city hall, $985,000; auditorium and armory, $1,019,700; hospital addn., $458,000; nurses home addn. $150,000; health center, $125,000. Financing not provided. CD 4/26/43—ENR 4/29/43.

Wis., Madison—City, J. R. Law, mayor, City Hall, vocational school addn., for Bd. Vocational & Adult Education. $275,000. Financing not provided.

★**Wis., Wauwatosa**—City, 7616 Harwood Ave., school. $800,000. Financing not provided.

Alta., Lethbridge—Lethbridge School Div. 7, Mrs. Jean Glover, Bank of Nova Scotia Bldg., Lethbridge, schools, $413,000. CD 3/24—ENR 4/6.

Man., Portage La Prairie—Municipality, low-priced dwellings. $150,000.

N. B., Grand Lake—New Brunswick Power Com., Saint John, plant exten. $100,000.

★**N. B., Saint John**—New Brunswick Electric Power Com., Saint John, steam power plants on North and East coasts of Province, $2,000,000.

N. B., Sussex—Municipality, H. N. Donald, clk., Sussex hospital, $150,000.

Ont., Collingwood—General Hospital Bd., Collingwood, nurses home, new wing is operating ward, $175,000.

Ont., Kingston—City, F. J. Parker, clk., City Hall, ratepayers approved memorial centre. About $325,000.

Ont., Kingston—Municipality, hydro bldg. $150,000.

Ont., London—City, K. G. Crawford, clk., City Hall, convalescent hospital. About $150,000.

★**Ont., London**—Bd. Educ., C. C. Carrotheras, chn., City Hall, exten. South London Collegiate, $245,000; exten. Sir Adam Beck Collegiate, $245,000; constructing 2 schools in North London, $450,000; school addns., on Lorne Empress and Ealing Aves., $240,000.

★**Ont., Ottawa**—Ottawa Public School Bd., Gilour and O'Connor Sts., 14 classroom school, etc. Kent St. $650,000.

Ont., Ottawa—Separate School Bd., Murray St., school replacing Ste. Anne's School, $150,000.

Ont., Swansea—Municipality hydro substation and sys. imprvs. $50,000.

Ont., Swansea—Municipality, memorial library, fire station, town hall addn. $200,000.

Que., Montreal—Municipality, wing addn. to bldg. where police headquarters and health dept. is now housed. $650,000.

★**Que., Montreal**—Municipality, food terminal bldg. $1,000,000.

Sask., Saskatoon—City, (The Community Centre Development Comn., A. J. Tratter, chn.), community hall. About $150,000.

Sask., Saskatoon—Provincial Govt., c/o Ministry of Public Health, Regina, home for epileptics, $150,000 or more.

PLANS UNDER WAY

Calif., Eureka—City, City Hall, gymnasium and swimming pool. $212,000. Geo. S. Winzler, City Hall, city engr. CD 9/8—ENR 9/21.

Calif., Hillsborough—Hillsborough School Dist., Hillsborough, plans by H. A. Thomsen, Jr., 315 Montgomery St., San Francisco, school, consisting auditorium-gymnasium, swimming pool, etc., on 15 acre site. Over $150,000.

★**Calif., Los Angeles** — City Bureau of Power & Light, 207 S. Bway., plans under way imprvs. at Harbor Steam Plant, $6,275,000; plans 15% completed imprvs., betterments at San Francisco Power Plant 1, $240,700; plans 75% completed imprvs., betterments at San Francisco Power Plant 2, $84,000; plans 10% completed imprvs., betterments at Seal Beach Steam Plant, $74,200; plans 5% completed fuel oil protection, etc., at Alameda Steam Plant, $500,000. Financing available. E. E. Morris, ch. engr., and R. R. Robertson, ch. electrical engr., 207 S. Bway.

★**Calif., Oakland**—City, City Hall, plans by B. Mills & F. L. Confer, chn. Bd. Architects, 1214 Webster St., civic center, incl. federal bldg., $6,000,000; state bldg., supplementary court house, city library and city court bldg., $15,000,000. W. E. Alworth, City Hall, city planning engr.

Calif., Pacific Grove—City, City Hall, plans by C. J. Ryland, 136 Bonifacio Pl., Monterey, auditorium, seating 1,500 people. $

Calif., Santa Rosa—Mendocino Co., Co. house, plans by C. A. Caulkins, Bldg., hospital and tuberculosis sanitarium $200,000.

Calif., Stockton—City, City Hall, library. $240,000. L. Payton, City city engr.

★**Calif., Stockton**—San Joaquin Co., C. House, county office bldg., as first unit court house, $153,000; addn. modern at San Joaquin General Hospital, $ J. B. Manthey, Court House, co. engr 6/24/43—ENR 7/1/43.

Conn., Oxford — Town, Bd Selectmen Town Hall, preliminary survey by Brown Von Beren, Inc., 295 Sherman Ave., Haven, brick, steel town hall and incl. auditorium. $150,000.

Ill., Red Bud—City, City Hall, preliminary plans power plant, $40,000. Russell & 4903 Delmar Blvd., St. Louis 8, Mo., engrs.

Fla., Lake Worth—City, City Hall, 10% completed new power plant. Bids within 60 days on 1,500 kw. engine unit. Burns & McDonnell Co., 107 W. Linwood Blvd., Kansas Mo., consult engr.

★**Kan., Coffeyville**—City, City Hall, under way light plant imprvs., incl. 000 kva. turbine generator, high boilers, cooling tower, building $1,400,000. Black & Veatch, 4706 Kansas City, Mo., consult. engrs. Duckworth, Coffeyville, engr.

Kan., Osawatomie—City, city hall, torium, $200,000. Financing not Burns & McDonnell Engrg. Co., 107 W. wood Blvd., Kansas City, Mo., engr.

★**Md., Baltimore**—City, City Hall, plans der way, fire stations, Park Heights Strathmore Aves., B. C. 84, $113,500; delphia and North Point Rds., B. C. $113,500; Loch Raven Blvd. and Havenw Rd., B. C. 88, $55,000; Shell Rd. and Ch peake Ave., B. C. 100, $113,500; Cherry and Old Annapolis Rds., B. C. 105, $11 Financing provided. N. L. Smith, Munici Bldg., ch. engr. CD 1/27/44—ENR 2/10

Md., Baltimore—City, City Hall, pl under way recreation bldg. and Har Park Playground, etc., B. C. 132. Financing available. N. L. Smith, ch. en CD 10/21/43—ENR 10/28/43.

★**Md., Baltimore**—City, City Hall, pl by W. W. Emmart, Fidelity Bldg., 1, School 29, Pulaski and Fresstman Sts B. C. 73, $285,000; plans by L. R. Hall, Pa Rd., Upperco, Schools 124 and 139, and Orleans Sts. B. C. 74, $250,000; plans Taylor & Fischer, 1012 N. Calvert St., 2, vocation school, Kirk and 25th Sts., B 75, $1,000,000; plans by E. H. Glidden, 1201 St. Paul St., Zone 2, Northwest Jun High School, B. C. 79, $700,000; plans Palmer & Lamdin, 1020 St. Paul St., Zone Girls' Vocational School, B. C. 81, $ plans by W. F. Stone, Jr., 2611 N. Cha St., Baltimore, Zone 18, Carver Colored and Girls Vocational School, B. C. 81, $1, 000; plans by T. W. Jamison, Jr., 12 Pleasant St., Baltimore, Zone 2, school Northwood, B. C. 82, $300,000. Financ available. CD 2/28/44—ENR 3/9/44.

★**Md., Baltimore**—City Dpt. Health, C Hall, plans by J. R. Edmunds, Calv Bldg., Zone 1, health department hea quarters, B. C. 128, $850,000; Southe Health District Bldg., B. C. 129, $125, Financing available. CD 7/20—ENR 8/10

★**Md., Baltimore**—City, Dpt. P. Bldg City Hall, plans by J. R. Edmunds, Ca vert Bldg., Zone 2, people's court a archives bldg., B. C. 153, $200,000. Financ ing provided. CD 7/20—ENR 8/10.

★**Md., Baltimore**—City, Dpt. Welfare, C Hall, plans underway dispensary bldg B. C. 126, $250,000; headquarters bldg. Civic Center, garage, B. C. 127, $ Financing available. N. L. Smith, Municip Bldg., ch. engr.

★**Md., Cambridge**—State Bd. Mental Hy giene, 330 N. Charles St., Baltimore plans 10% completed by W. E. Wilso Booth, Salisbury, chronic disease hospital at Eastern Shore Hospital, $750,000. Financ ing not provided.

Md., Glen Burnie—State, Annapolis, pla by F. A. Fletcher, 7 E. Franklin St., Balti more, Zone 2, cottage, farm center bldg administration bldg. addn., at Maryland Training School for Colored Girls. $ CD 3/28—ENR 3/9.

Mass., Greenfield—City, Dpt. P. Wks., Ci Hall, plans by J. A. Britton, 20 Federal St brick, concrete bldg. for storage, office garage, Wells St., for Dpt. P. Wks. $ Financing not provided.

Mich., Ann Arbor—Bd. Educ., Ann Arbor plans by P. Kasurin, Ann Arbor, brick, steel stone, concrete Junior High School, $

★**Minn., Minneapolis**—Bd. Educ., A. Hoe ker, clk., 308 City Hall, plans under pleted Southwest High School addn., 47 and Beard Ave. S., $500,000. Financing provided. CD 1/17—ENR 2/3, under for Bids.

POSTWAR PROJECTS (Cont'd.)

★**Minn., Minneapolis**—University of Minnesota, Bd. Regents, W. T. Middlebrook, comptroller. Administration Bldg., Main Campus, plans by C. H. Johnston, 715 Empire Bank Bldg., St. Paul, 13 story Mayo Memorial bldg., rein.-con., brick, stone, on Main Campus. $2,000,000. CD 4/7—ENR 5/16.

★**Mo., Normandy (St. Louis, 21, P. O.)**—Normandy Consolidated School Dist., F. H. Miller, supt. Bd. Educ., 6701 Easten Ave., Normandy, St. Louis, Zone 21, plans by Wm. B. Ittner, Inc., 408 Bd. of Education Bldg., 911 Locust St., St. Louis, Zone 1, brick, concrete, stone high school, Lucas, Hunt and St. Charles Rock Rds. $1,150,000 bond issue approved. CD 1/23—ENR 2/8.

★**N. J., Trenton**—State, W. State St., plans by H. Kelly, 921 Bergen Ave., Jersey City, 8 story, brick, steel bldg. facing present capitol bldg., and repairing, modernizing, capitol bldg. $15,000,000.

N. Y., Buffalo—City, City Hall, plans by J. W. Kideney, Prudential Bldg., Buffalo, and Saarinen & Swanson, Birmingham, Mich., brick, stone, steel, concrete library. $1,000,000. CD 9/14—ENR 10/5.

N. Y., Genesee—Comrs. Livingston Co., Geneseo, plans under way county home and infirmary. $250,000. State Aid Planning Funds allotted.

N. Y., Ilion—Village, plans under way garage, $65,000. State Aid Planning Funds allotted.

N. Y., Lyndonville—Village, plans under way bus garage and addn. to Central School, $67,432. State Aid Planning Funds allotted.

★**O., Cincinnati**—University of Cincinnati, Clifton Ave., plans by H. Hake, 2400 Gilbert Ave., university bldg. $1,000,000.

O., Lockland—Bd. Educ., Wyoming and Cooper Sts., plans by Grunkemeyer & Sullivan, 5717 Eastern Ave., Cincinnati, physical education bldg. $150,000. Funds available. CD 11/20—ENR 11/30.

O., Portsmouth — City, City Hall, plans 96% completed hospital addn., health center, Fresh Air Camp addn. $270,000. Financing not provided. J. F. Parkinson, City Hall, engr.

★**Ore., Salem**—State Bd. Control, Salem, plans by P. Belluschi, 2040 S. W. Jefferson St., Portland, 2 story therapeutic treatment bldg., at State Hospital. $550,000. $445,000 available. CD 6/19—ENR 6/29.

★**Ore., Salem**—State Bd. Control, Salem, plans by Whitehouse, Church, Newberry & Roehr, Builders Exchange Bldg., Portland, 5 story, rein.-con. office bldg. $1,500,000. Financing provided.

★**Pa., Phila**—Bd. Educ., A. B. Anderson, secy., 21 and Parkway, plans 50% completed school addns. and alterations, Proj. 1, $150,000; Proj. 2, $150,000; Proj. 3, $150,000; Proj. 4, $150,000; Proj. 5, $150,000; Proj. 6, $150,000; Proj. 7, $150,000; Proj. 8, $150,000; Proj. 9, $150,000; Proj. 10, $150,000; Proj. 11, $150,000; Proj. 12, $150,000; Proj. 13, $150,000; Proj. 14, $150,000; Proj. 15, $150,000; Proj. 16, $150,000; Proj. 17, $150,000; Proj. 18, $150,000; Proj. 19, $150,000; Proj. 20, $150,000; Proj. 21, $150,000; Proj. 22, $150,000; Proj. 23, $150,000; Proj. 24, $150,000; Proj. 25, $150,000; Proj. 26, $150,000; Proj. 27, $150,000; Proj. 28, $150,000; Proj. 29, $150,000; Proj. 30, $150,000; Proj. 31, $150,000; Proj. 32, $150,000; Proj. 33, $150,000; Proj. 34, $150,000; Proj. 35, $150,000; Proj. 36, $150,000; Proj. 37, $150,000; Proj. 38, $150,000. Financing not provided.

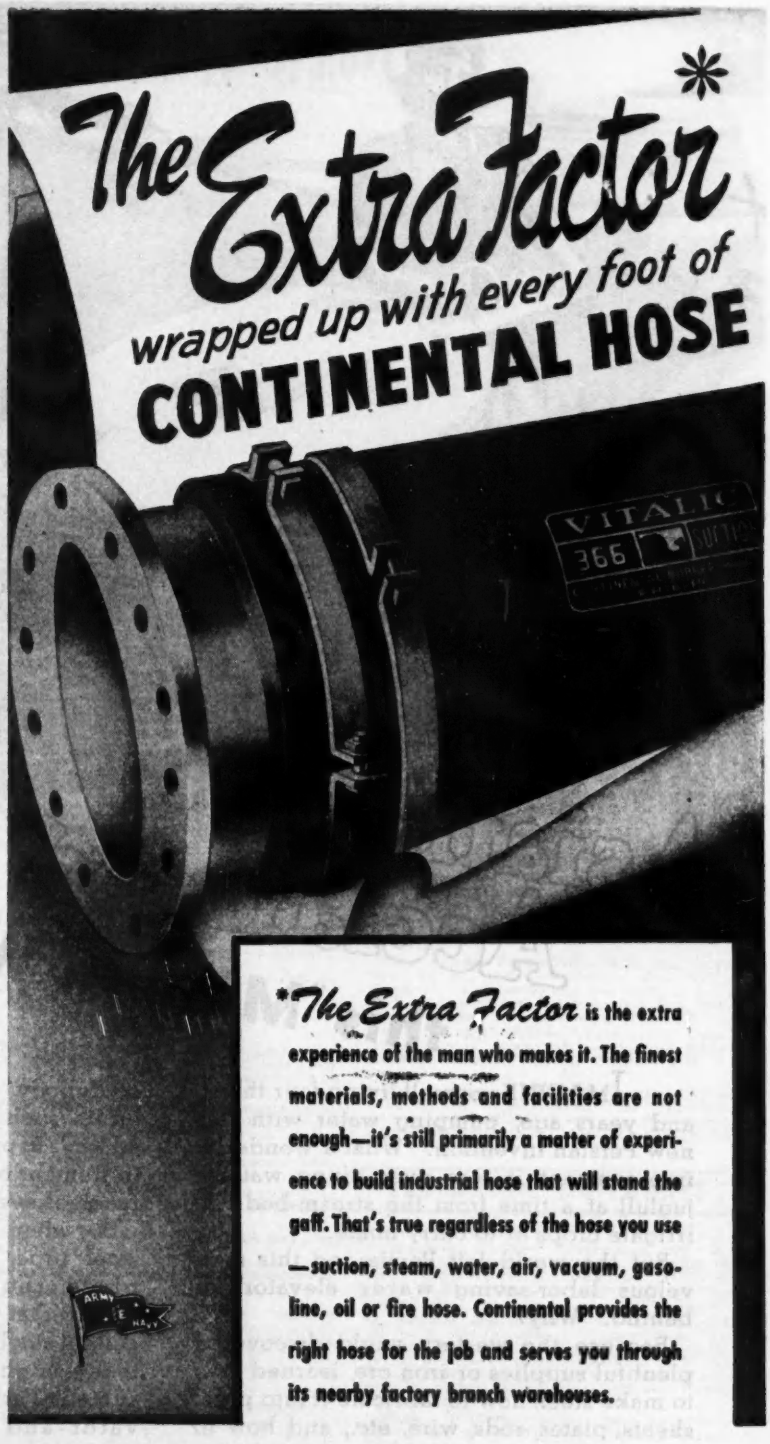
★**Pa., Phila.** — Bd. Educ., A. B. Anderson, secy., 21 and Parkway, plans 25% completed North Philadelphia School, $500,000; North Philadelphia Junior High School $750,000; North Philadelphia Junior High School 1, $750,000; South Philadelphia Senior High School, $750,000-$1,000,000; West Philadelphia Vocational School, $500,000. Financing not provided.

★**Pa., Phila.** — Bd. Educ., A. B. Anderson, secy., 21 and Parkway, plans 25% completed Northeast Phila. Elementary Proj. 1, $750,000; Northeast School, Proj. 2, $750,000; Northeast Phila. School, Proj. 3, $750,000; Northeast Phila. Vocational School $750,000; Northeast Phila Senior High School, $1,000,000-$2,000,000; South Phila. School, $500,000; West Phila. School 1, $500,000; West Phila. School 2, $500,000; West Phila. Junior High School, $500,000; Central City Junior High School, $500,000; Central city Vocational High School, $500,000; Central City Recreation Bldg., $500,000. Financing not provided.

★**S. C., Charleston**—South Carolina State Ports Auth., Columbia, freight terminal and pier, $16,000,000. Financing not provided. Lockwood Greene Engineers, 10 Rockefeller Plaza, New York, N. Y., consult. engrs.

S. D., Pierre—State, A. B. Blake, Finance Secy., Pierre, preliminary plans completed by R. Spitznagel, 309 Western Surety Bldg., Sioux Falls, state office bldg. $275,000.

★**Tenn., Knoxville**—Knox Co., County Court House, plans by Barber & McMurry, 517½ W. Church Ave., court house, $1,100,000; workhouse for women, $150,000; Smithwood School, $130,000; Bearden School addn., and Youngs High School addn., $75,000; tuberculosis hospital (sponsored by state), $400,000.



*The Extra Factor is the extra experience of the man who makes it. The finest materials, methods and facilities are not enough—it's still primarily a matter of experience to build industrial hose that will stand the gaff. That's true regardless of the hose you use—suction, steam, water, air, vacuum, gasoline, oil or fire hose. Continental provides the right hose for the job and serves you through its nearby factory branch warehouses.

BRANCHES

Baltimore, Md.	Cleveland, Ohio	Greensboro, N. C.	Lutz, Fla.	Pittsburgh, Pa.
Boston, Mass.	Dallas, Texas	Hartford, Conn.	Memphis, Tenn.	Rochester, N. Y.
Buffalo, N. Y.	Dayton, Ohio	Indianapolis, Ind.	Milwaukee, Wis.	St. Louis, Mo.
Chicago, Ill.	Detroit, Mich.	Kansas City, Mo.	New York, N. Y.	San Francisco, Cal.
Cincinnati, Ohio	Evansville, Ind.	Los Angeles, Cal.	Philadelphia, Pa.	Syracuse, N. Y.

CONTINENTAL RUBBER WORKS

ERIE, PENNSYLVANIA, U. S. A.

Asiatics Acclaimed this "Modern" Water Elevator

IMAGINE yourself living four thousand years ago, pumping water with this new Persian invention. What a wonderful improvement it was over lifting water a jugfull at a time from the stream-bed...to irrigate crops or to carry home.

But the world left Persia and this marvelous labor-saving water elevator far behind. Why?

Because the western world discovered plentiful supplies or iron ore, learned how to make steel, how to fabricate it into pipe, sheets, plates, rods, wire, etc., and how to manufacture an endless variety of products that would amaze and confound those ancient Persian inventors. Pumps, valves, tanks, piping and other parts of modern water supply systems are possible for everybody only because steel manufacturers, such as Youngstown, have developed ways to produce steel and steel products in tremendous quantities, at a cost within reach of everyone.

So when you buy or use a piece of steel pipe, inexpensive and commonplace though it is, you may well realize that without our abundance of excellent steel we in America today might be using the ancient Persian water elevator-and still calling it modern.

QUALITY YOUNGSTOWN SERVICE

YOUNGSTOWN

THE YOUNGSTOWN SHEET AND TUBE COMPANY

YOUNGSTOWN OHIO

Manufacturers of

CARBON · ALLOY AND YOLOY STEELS

Pipe and Tubular Products · Sheets · Plates · Conduit Bars Coke Tin Plate Electrolytic Tin Plate Rods Wire Nails Tie Plates and Spikes

CONSTRUCTION REPORTS

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.

ELSIE EAVES, Manager — *SCOTT McLEOD, Statistics* — *J. A. MAHONEY, Reports*

(Daily service also available—Write for details)

WATER SUPPLY

PROPOSED WORK

Pa., Phila.—City, J. Neeson, dir., Dpt. P. Wks., preparing plans water pipe, appurtenances, Tabor Rd., Comley, Mascher, Robbins and Rascomb Sts., Devereaux, Olney, Oxford, Princeton, Rising Sun and Wellens Aves., $20,000 each; Ashdale, Benner, Bingham and C. Sts., $15,000 each; Front St., (north side Roosevelt Blvd.), $15,000; Front St., (Ashdale St. to Dunconnon Ave.), $15,000. M. J. McLaughlin, Water Bureau Chief.

†Tex., Austin—U. S. Eng., Fort Sam Houston, bids soon water sys. addn., incl. 20x38 ft. tex. bids soon water sys. addn., incl. 20x38 ft. wooden booster station, concrete fdn., installing electric service and 3 pumps, 5,000 ft. 8 in. c.i. watermains, etc., Serial No. W-41-154-45-88, Camp Mabry Ordnance Shop. CD 2/16.

B. C., Vancouver—Greater Vancouver Water Dist. Bd., renewing watermains, incl. replacement 18 in. with 24 in. steel mains over False Creek. $60,000.

BIDS ASKED

Bids Asked March 6

Miss., Decatur—Mayor and Bd. Alderman, Decatur, water treatment plant, incl. aerator, chemical feed machine, chemical feed machine house, settling tank, pump, pressure filter, hypochlorinator, test set, valves, electrical work, pipes and other accessories. W. E. Johnson, Jackson, engr.

LOW BIDDERS

†Tex., Fort Worth—S. H. Bothwell, city mgr., Feb. 13, Contr. 5, rebuilding Holly pump. plant, Tex. 41-641-N, from Glade Const. Co., Century Bldg., **$144,906. FWA.** Freese & Nichols, Capps Bldg., engr. CD 2/2.

CONTRACTS AWARDED

N. D., Mayville—City, H. N. Kaldor, auditor, City Hall, imprv., repairing dam on Goose River, to Jardine Bridge Co., Inc., Fargo, **$15,800.** Bids 1/10, Lium & Burdick, YMCA Bldg., Grand Forks, engrs. CD 1/24—ENR 2/1.

Tex., West—City, City Hall, deep test water supply well, to J. L. Myers & Son, Denton, approx. **$20,000.** Est. $25,000. CD 2/8—ENR 2/15.

Va., Richmond—Dpt. P. Wks., Shields Lake purification project, to Van Doren Brothers, 2911 Hawthorne Ave., **$17,005.** Bids Asked 2/5.

Wash., Port Townsend—City, C. F. Christian, clk., City Hall, replacing steel pipeline, to Steel Tank & Pipe Co., 518 N.E. Columbia Blvd., Portland, Ore., **$38,032.** Bids 1/23. CD 1/31—ENR 2/1, under LB.

SEWERS, WASTE DISPOSAL

PROPOSED WORK

Calif., Los Angeles—Los Angeles Co., Hall of Records, sanitary sewers in Wilma Ave. and other streets, in vicinity of East Los Angeles, $26,400. A. Jones, Hall of Records, co. engr.

N. J., Carteret—Carteret Boro, J. A. Turk, chn. Sewer Com., Cooke Ave., surveys, sewage treatment plant. $150,000. W. A. Goff, Broad St. Suburban Station Bldg., 1617 Penna Ave., Phila., Pa., engr.

Tex., Dallas—Idlewild Addition, c/o Capt. A. C. Aechternacht, 4308 Caruth St., sanitary sewer facilities. Over $25,000.

Tex., Lamarque—Lamarque Developing Co., Lamarque, soon lets contract storm and sanitary sewers, water distr. sys., paving, curbing, guttering and sidewalks. Hailie & McClendon, 2807 San Jacinto St., Houston, engrs.

Tex., Texas City—Town, Town Hall, voted bonds, sanitary sewers, $150,000. J. J. Rady, Insurance Bldg., Fort Worth, engr. CD 12/1—ENR 12/7.

★N. Y., Idlewild—Dpt. Marine & Aviation, Pier A, North River, New York, Zone 4, Contr. 2423, Sect. 2, storm water sewer outlet from Baisley Blvd. to Bergen Basin at Municipal Airport, Contr. 10, to A. Catapano, 147-45 Springfield Blvd., Laurelton, **$1,148,834;** Contr. 2421, Sect. 1, Contr. 9, to Nicholas DiMenna & Sons, Inc., 1525 Blondell Ave., New York, Zone 61, **$852,000.** Bids 1/15. CD 1/19—ENR 1/31, under LB.

Tex., Alvin—Leverton & Co., 1119 S. Hempill St., sewage disposal plant, force account, $35,000. Howe & Wise, 610 Stewart Bldg., Houston, engrs. CD 12/28.

Location of ENR Correspondents

Symbols and Abbreviations Include:

†	Federal Government
★	Project of $500,000 or over
ENR	Engineering News-Record
CD	Engineering New-Record Construction Daily

Projects—By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterworks, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

Classes of Construction

(Name in order of Listing)

Water Supply
Sewers, Waste Disposal
Bridges
Streets & Roads
Earthwork, Waterways
Latin America
Public Buildings
Commercial Buildings
Industrial Buildings
Unclassified

Stages Reported

PROPOSED: (except Streets & Roads); BIDS ASKED (new announcements only. For full calendar, see also preceding issues of ENR);

LOW BIDDERS: On jobs below $500,000 value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: Except awards to low bidders previously reported in low bidder stage.

Dates shown are of issue in which last previous report was published.

LOW BIDDERS

D. C., Wash.—District Comrs., District Bldg., Feb. 13, Deanwood storm water sewer, vicinity 50 St. and Sherriff Rd. N.E., from Peter D'Adamo Constr. Co., 7 W. 25 St., Baltimore 18, Md. **$63,489.** CD 1/31.

CONTRACTS AWARDED

†Md., Bainbridge (sta. Port Deposit)—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., sewer, Naval Training Center, NOY 11513, to John Matricciani & Sons, 119 S. Exeter St., Baltimore, **$26,000.** Bids 1/31. CD 1/25—ENR 2/1.

BRIDGES

BIDS ASKED

Bids Asked February 27

Virginia—Commonwealth of Virginia, Dpt. Hys., Richmond, 293 ft. bridge over Rivanna River, Route 624, S.P. S1343-B1, Fluvanna Co. Plans deposit $2.

Que., Ste. Edwige de Clifton—E. Martineau, municipality secy., bridge over Aux Saumous River. $30,000. Dpt. P. Wks., Quebec City, engr.

LOW BIDDERS

California—State Div. Hys., 858 State Bldg., Los Angeles, Feb. 8, rein.-con. overhead crossing, paving, etc., Los Angeles Co., from Griffith Co., 1060 S. Bway., Los Angeles, **$56,094.** CD 1/22—ENR 2/1.

Nebraska—State Dpt. Road & Irrigation, Lincoln, Feb. 8, imprv. steel superstructure, Fremont-Elk City, Proj. WER-2-c(1), Douglas Co., from Bethlehem Steel Co., 400 N. Michigan St., Chicago, Ill., **$29,900.** CD 1/31.

CONTRACTS AWARDED

★Ill., Chester—Chester Bridge Comn., City Hall, reconstructing center spans of Chester Toll Bridge, to Massman Constr. Co., 737 New York Life Bldg., Kansas City, Mo., **$656,384.** CD 10/27—ENR 11/2, under LB.

STREETS AND ROADS

PROPOSED WORK

Puerto Rico, San German—City, plans constructing 3 kilometers of Cain Alto Roads. $80,000.

BIDS ASKED

Bids Asked March 1

Ia., Spirit Lake—Bd. Supervs. Dickinson Co., grading 14 mi. secondary roads, 180,000 cu. yd. earth excav. Over $25,000. R. A. Furman, Spirit Lake, co. engr.

†N. J., Fort Dix (br. Trenton)—U. S. Eng., 120 Wall St., New York 5, N. Y., paving. $16,000. Extended date.

LOW BIDDERS

†Calif., Van Nuys—U. S. Eng., 751 S. Figueroa St., Los Angeles, Zone 14, Feb. 10, roads, drainage facilities, at Birmingham General Hospital, No. 216, from Pan American Engineering & Constr. Co., 555 S. Flower St., Los Angeles, **$38,184.**

CONTRACTS AWARDED

Georgia—R. W. McCrum, office mgr. No. 2, Capitol Sq., Atlantic, imprv., Farmers Market Site, on Moultrie-Quitman Rd., approx. ⅛ mi. east of Moultrie, Colquitt Co., to Cecil H. Dun Constr. Co., Moultrie, **$31,799.** CD 2/1.

†Ill., Forrest Park—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., roads and test bldg., N.O.P., NOY 11779, to Chas. B. Johnson & Son, Inc., 6 N. Michigan Ave., Chicago, **$26,350.**

Ont., Wilton Grove—Westminster Twp., Wilton Grove, graveling roads, day labor. **$25,000** available. G. A. Shaver, R.R. 1, engr.

Que., Montreal—PLANT—Carter White Lead Co. of Canada, Ltd., 1295 Delormier Ave., reconstructing plant, to Foundation Co. of Canada, Ltd., 1434 W. Sherbrooke St. Est. **$40,000.**

EARTHWORK, WATERWAYS

PROPOSED WORK

Illinois—State Div. Waterways, 201 W. Monroe St., Springfield, imprv. channel of Little Calumet River, Cook Co. **$200,000.** T. B. Casey, acting ch. engr. CD 10/27—ENR 11/2.

★†Illinois and Missouri—U. S. Eng., 816 U. S. Courthouse & Customhouse, St. Louis 2, Mo., revetment work to stop foundation erosion to safeguard Chain of Rocks Bridge over Mississippi River between Madison, Ill. and St. Louis, Mo. $500,000. Funds appropriated.

Mass., Whitman—Town Bd. Selectmen, Town Hall, permanent dam, Harding's Pond, Pine St.

N. J., Stone Harbor—City, J. R. Biggs, mayor, repairing seawall, $30,000.

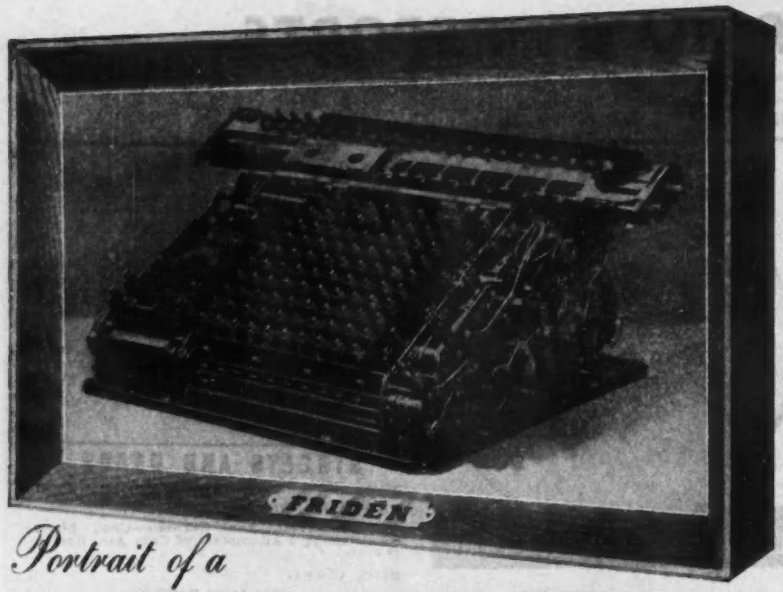
†Tex., Kelly Field (br. San Antonio)—U. S. Eng., Fort Sam Houston, drainage, open ditch and concrete pipe, depot area. $25,000.

Que., St. Jean Baptiste de Rouville—Municipality, L. Blanchard, secy., drainage ditch. $50,000.

BIDS ASKED

Bids Asked March 1

Ia., Spirit Lake—Bd. Supervs. Dickinson Co., Spirit Lake, clean out Drainage Dist. 2, involving 45,000 cu. yd. open ditch and constructing Drainage Dist. 21, 66,622 lin. ft. 6- to 24-in. drain tile. Over $150,000. R. A. Furman, Spirit Lake, co. engr.



Portrait of a

MECHANICAL MIND

Here is a Fridén Fully Automatic Calculator with its streamlined covers removed....a figuring instrument comprised of thousands of parts of infinite precision which work together in perfect coordination to produce answers of absolute accuracy.

This Fridén conceived and built mechanical mind reduces multiplication, division, addition and subtraction to its simplest form. Merely set in the factors and touch the proper key...*for with a Fridén the calculator and not the operator does the work.*

Why not put this tireless and unfailing mechanical mind to work on your figure production? Contact your local Fridén Representative, or write to the Home Office in San Leandro, California, for complete information regarding these calculators which are available when applications for delivery have been approved by the W. P. B.

Fridén Mechanical and Instructional Service is available in approximately 250 Company Controlled Sales Agencies throughout the U. S. and Canada.

FRIDÉN

FRIDÉN CALCULATING MACHINE CO., INC.

HOME OFFICE AND PLANT - SAN LEANDRO, CALIFORNIA, U. S. A. - SALES AND SERVICE THROUGHOUT THE WORLD

EARTHWORK, WATERWAYS (Bids Asked Cont'd.)

Bids Asked March 6

La., Shreveport—Bd. Comrs., Caddo Levee Dist., Court House Bldg., bids alike and lumber mattress revetments on Red River. Dpt. P. Wks., Capitol Bldg., Baton Rouge, engrs.

Bids Asked March 8

Ia., Pocahontas—Bd. Supervs. Pocahontas Co., Pocahontas, furnishing labor and material for Imprv. Drainage Dist. 156, 9,400 lin. ft. 8- to 18-in. tile; Drainage Dist. 155, 1,950 lin. ft. 8 and 12 in. tile. Over $10,000. A. L. Thornton, Pocahontas, co. engr.

LOW BIDDERS

Ill., Joliet—State Div. Waterways, 201 W. Monroe St., Springfield, Feb. 8, clearing, grubbing, deepening, widening, removing obstructions, removing debris and spoil from certain reaches of Hickory Creek in Joliet Twp. and city of Joliet, clearing 1 mi. creek channel between Chicago and Richard Sts. from Thomas M. Madden Co., 4610 Van Buren St., Chicago, $64,650. CD 2/2.

†**N. M., Tucumcari**—Bureau Reclamation, Dpt. Interior, Feb. 12, structures in for Bell, Elliot, Roberts, State, Jack County, Liberty, Young, Coulter, Hurley and Bend laterals and sublaterals, 3 to 4 mi. north and west of here, Spec. 1093, from R. E. Ziebarth, 815 W. 17 St., Long Beach, Calif., $130,6... CD 1/30—ENR 2/1.

CONTRACTS AWARDED

†**Illinois**—U. S. Eng., 816 U. S. Courthouse and Customhouse, St. Louis 2, Mo., levee repair work, involving 400,000 cu. yd. earthworth, gravity drainage structures rein. con. headwall structures, drainage gates etc., Greene Co., Neg. 23-065-45-81, to Sternberg Dredging Co., Arcade Bldg., 104 Olive St., St. Louis 1, Mo. Est. $150,000. Bids 1/17.

PUBLIC BUILDINGS

PROPOSED WORK

★†**Ala., Tuscumbia**—Robbins Tire & Rubber Co., Tuscumbia, plans by H. A. Griffith Jr., Sheffield, 1 story, 100x500 ft., and part 2 story, 100x100 ft., brick concrete, steel tire factory. Approx. $500,000. Defense Plant Corp. will finance. CD 2/12—ENR 2/15.

†**Calif., Santa Ana**—Pub. Housing Auth., NHA, 760 Market St., San Francisco, 140 unit family dwellings, Calif. 4026-N, for Navy.

†**Calif., Stockton**—Pub. Housing Auth., NHA, 760 Market St., San Francisco, 100 unit family dwellings, for Navy, Calif. 4025-N.

Conn., Middletown—City, Mayor's office, City Hall, plans by W. Towner, 144 Court St., altering bldg. into terminal waiting room and comfort station. $40,000.

†**Ind., Kingsbury-La Porte**—Pub. Housing Auth., NHA, 201 N. Wells St., Chicago 6, Ill., 200 unit family stop-gap housing, Ind. 12204.

★**Man., Winnipeg**—City, preparing plans incinerator. E. $0,000. Greeley & Hansen, 6 N. Michigan Ave., Chicago, Ill., U. S. A., engrs.

Minn., Minneapolis—State Bd. Regents, University of Minnesota, W. C. Coffey, pres., Administration Bldg., Main Campus, hospital on main campus of State University, $700,000.

★†**Md., Bethesda (br. Wash., D. C.)**—Pub. Bldgs. Admin., 18 and F St. N.W., Wash. 25, D. C., preparing plans 2 story, bemnt., virus and infections laboratory, brick, steel, concrete. $700,000. FWA. CD 1/24—ENR 2/1.

★**Mich., Litchfield**—School Bd., Litchfield, plans by O'Dell, Hewlett & Luckenbach, 2217 Dime Bank Bldg., Detroit, brick, steel, rein.-con. Elementary and Junior High Consolidated School. $500,000.

†**Tex., Midland**—Pub. Housing Auth., NHA, 1411 Electric Bldg., 7 and Lamar Sts., Fort Worth, Zone 3, plans by Voelcker & Dixon, engrs.-archts., 702 Main St., Lubbock, 100 unit family trailer housing, Tex. 41491. CD 2/3—ENR 2/15.

MITCO

OPEN STEEL FLOORING

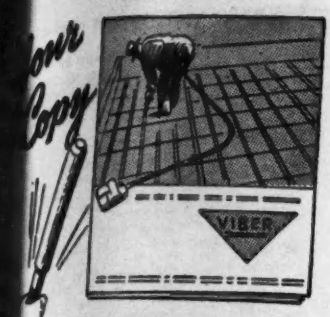
Pressure Formed

90% Open Area

Easy to Install

Hendrick Manufacturing Company

45 Dundaff Street, Carbondale, Pa.



Write or Wire Today!

Like money in the bank—having this completely detailed and illustrated catalog on latest

VIBER

Concrete Vibrators

the facts and you'll
ch from ordinary con-
e vibration to high speed,
ey-saving VIBER-ation.

VIBER COMPANY

South Flower Street
URBANK, CALIFORNIA

GRIFFIN

WELLPOINT SYSTEMS

JETTING PUMPS

FOR SALE RENT

Prompt Shipments

Send for our New 60 page illustrated catalog

"GRIFFIN POINTED WELLPOINT FACTS" chock full of latest information on Wellpoint Systems for dewatering, emergency and permanent water supply systems, also information on pressure pumps and data for jetting.

RIFFIN WELLPOINT CORP.

81 EAST 141st ST. • NEW YORK 54, N. Y.

Phones: MElrose 5-7704-5-6

PUBLIC BUILDINGS (Proposed Work, Cont'd.)

†Tex., Houston—U. S. Eng., Avenue F and 25 St., Galveston, electric sub-station for fuse plant, $40,000; altering shop for use as fuse mfg. plant, over $40,000.

†Tex., Temple—U. S. Eng., Fort Sam Houston, recreation center for McCloskey Hospital, incl. lake, athletic courts, grading, drainage, etc., 54 acre site. $50,000 or more.

†Wash., Anacortes—Whidbey Island—Pub. Housing Auth., NHA, Skinner Bldg., 5 Ave. and Union St., Seattle, Zone 1, 65 unit family dwellings, Wash. 45314-N, for Navy.

†Wash., Seattle—Pub. Housing Auth., NHA, Skinner Bldg., 5 Ave. and Union St., Seattle, Zone 1, 415 unit family dwellings, Wash. 45316-N, for Navy.

Neb., Lincoln—State Bd. Control, Capitol Bldg., shop bldg. at penitentiary. $300,000.

†N. Y., Northport—Veterans Admin., Vermont Ave. between H and I Sts. N.W., Wash. 25, D. C., preparing plans warehouse addn.

†N. C., Camp Butner (br. Durham)—U. S. Eng., 308 Customhouse, Wilmington, convalescent hospital.

BIDS ASKED

Bids Asked March 2

†Tex., Amarillo—Pub. Housing Auth., NHA, 1411 Electric Bldg., 7 and Lamar Sts., Fort Worth, Zone 2, 500 unit family housing, Tex. 41693. Plans deposit $50. Rittenberry & Rittenberry, Fish Bldg., Amarillo, and Consolidated Architects & Engrs., Capps Bldg., Fort Worth, archts.

Bids Asked March 6

†D. C., Anacostia—Pub. Housing Auth., NHA Longfellow Bldg., 1201 Connecticut Ave. N.W., Wash., Zone 25, 300 permanent dwelling units, D. C. 1-6. L. K. Kahn, Bulletin Bldg., Phila., Pa., archt. CD 12/19—ENR 12/21.

Bids Asked

†N. Y., Niagara Falls—Pub. Housing Auth., NHA, 270 Bway., New York 7, N. Y., removing barrack type bldgs., at Pine Acres Development, crating and packing for shipment and re-erecting in France.

Pa., Phila.—Bd. Educ., A. B. Anderson, secy. and bus. mgr., 21 and Parkway, school, Horrocks and Tyson Sts. Office of E. P. Simon, Fidelity Phila. Trust Bldg., 123 S. Broad St., archt. C. H. Wolf, Otis Bldg., 112 S. 16 St. engr.

★**†Tex., Houston**—Hughes Tool Co., 300 Hughes St., constructing, equipping plant, $3,000,000. CD 12/28—ENR 1/4; heat treating shop, $2,500,000. Defense Plant Corp. will finance. CD 1/23—ENR 1/25.

LOW BIDDERS

★**†D. C., Wash.**—National Capitol Housing Auth., 1737 L St. N.W., Zone 25, Feb. 15, 440 unit dwellings, D. C. 1-3, from T. Calvin Owen, Albee Bldg., **$2,130,758.** CD 2/1—ENR 2/8.

†Md., Solomons—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., Feb. 14, torpedo overhaul test shop, NOY 11309, from Irons & Reynolds, 728 17 St. N.W., Wash., D. C. **$129,674.** CD 2/8.

★**†Tenn., Murfreesboro**—Veterans Admin., Vermont Ave. between H and I Sts. N.W., Wash. 25, D. C., Feb. 13, addnl. bldg. Veterans Hospital, from Foster & Creighton Co., American Natl. Bank Bldg., Nashville. **$1,779,887.** CD 1/8—ENR 1/11.

CONTRACTS AWARDED

†Calif., Benicia—U. S. Eng., 74 Montgomery St., San Francisco, bar stock and packing unit packing bldg. at Benicia Arsenal, Job 1686, to Stolte, Inc., 8451 San Leandro St., Oakland, **$83,387.**

†Ga., Bowdon—Textile Rubber Co., Inc., Bowdon, exten. plant and equip., to H. W. Richards, Carrollton, **$250,000.** Defense Plant Corp. will finance. CD 2/12—ENR 2/15.

COMMERCIAL BUILDINGS

PROPOSED WORK

Calif., Lakewood Village—Cameron & Tarnutzer, 4450 Camden Dr., Beverly Hills, 85 single, 2 and 3 bedroom, frame, stucco dwellings, steel fencing, etc. $350,000. W. G. Chandler, 7411 Beverly Blvd., Los Angeles, engr.

Ill., Chicago—Lawrence Bowl, H. L. Wessel, pres., 1820 Lawrence Ave., sketches by B. Leo Steif, 1150 N. State St., 1 story, brick recreation bldg., 32 bowling alleys, $250,000.

Ill., Peoria—Thelma Sweeny Convalescent Home, Peoria, plans by J. Fletcher Lankton, Beverley Theater, 2 story, bsmnt., rein.-con. convalescent home, $200,000. J. Ziegle, Beling Engineering Co., 501 15th St., Moline, engr.

Pa., Harrisburg—Colonial Theatre Co., 3 and Market St., Harrisburg, colonial theatre. $150,000.

Wis., Dodgeville—St. Joseph's Hospital, Dodgeville, plans by J. J. and T. H. Flad, 133 Langdon St., Madison, 2 story, 40 x 110 ft., steel, concrete, brick, tile nurses home, laundry, boiler room bldg., concrete fdn.

LEADITE

The Pioneer Self-Caulking Material for C. I. Pipe

THERE'S only one

The pioneer self-caulking material for cast iron bell and spigot water pipe which, for more than 40 years, has saved caulking time, digging time, melting time, handling time and charges . . . and made good tight joints which *improve with age!*

THE LEADITE COMPANY

Girard Trust Co. Bldg., Philadelphia, Pa.

No Caulking

RYERSON

REINFORCING and STRUCTURAL STEELS IN STOCK

• **Your nearby Ryerson plant carries complete stocks of all types of construction steels. Adequate facilities for cutting, bending, punching or otherwise preparing steels to meet your specifications are a part of our service. Ryerson men will be glad to work with you. Call: Joseph T. Ryerson & Son, Inc., Chicago, Milwaukee, St. Louis, Detroit, Cincinnati, Cleveland Buffalo, Boston, Philadelphia, Jersey City.**

RYERSON STEEL-SERVICE

Specify the Steel Pipe That Gives You These 5 Advantages

Here are five of the many reasons why ARMCO Spiral Welded Pipe cuts piping costs in all kinds of industrial plants . . .

6" TO 36"

1. Wide Size Range
ARMCO Spiral Welded Pipe is made in diameters from 6 to 36 inches, with wall thicknesses ranging from 1/4 to 1/2-inch. This unusual range enables the designer to choose the size best suited to each piping job.

2. Lengths Up to 50 Feet
You can obtain ARMCO Spiral Welded Pipe in any length up to 50 feet. Long or short lengths of this sturdy light-weight pipe may be hung or supported easily and economically.

3. Standard or Special Fittings
Our fitting shop is well equipped to fabricate odd or unusual fittings as well as the more standard types. By combining these with straight runs, unnecessary joints can often be eliminated.

4. Quick, Easy Installation
With ARMCO'S special method of pre-fabricating pipe, even the most complicated assemblies fit like a tailor-made suit. This means lower costs for handling and installation.

5. Little or No Maintenance
ARMCO'S custom-built piping saves time and trouble later, too. Longer lengths, fewer joints and welded fittings mean less chance for leaks. There are no threads to weaken the metal and invite corrosion.

Write for This Book
We'll be glad to help with your next piping job. Just send us your layout and ask for prices and complete facts. Meanwhile, write for the helpful bulletin—"6" to 36" Pipe for Industrial Uses." The American Rolling Mill Company, 731 Curtis Street, Middletown, Ohio.

ARMCO

ARMCO Spiral Welded Pipe

COMMERCIAL BUILDINGS (Cont'd.)

BIDS ASKED

Bids Asked February 15

★ **Ont., Toronto**—Marani & Morris, arch., 46 Bloor St. W., 6 story, bsmt., hospital addn., for Queen Elizabeth Hospital, Governors, 120 Dunn Ave. $600,000. 12/29—ENR 1/4.

CONTRACTS AWARDED

★ **Calif., Compton**—Community Bldg., 6307 Wilshire Blvd., Los Angeles, frame, stucco single family and duplex dwelling units, 120 St. and Avalon Blvd. Owner builds. $600,000. H. Gibbs, 441 First St., Long Beach, archt.

★ **Calif., Daly City**—Stonesom Bros., 1 Blvd., San Francisco, two hundred 1 story, frame dwelling units, on Edgewood Terrace, Hillside Blvd. and Gambetta separate contracts, $832,000.

★ **Calif., Los Angeles**—Federated Builders, 8472 Beverly Blvd., 142 frame, stucco single family dwellings, Grenshaw and Coliseum Blvd. Owner builds, $550,000. H. Hamer, 8473 Beverly Blvd., archt.

N. Y., New York—Bakers Trust Co., 1 Wall St., Zone 5, alterations providing banking facilities in International Building, Rockefeller Center, to Turner Constr. Co., 420 Lexington Ave., Zone 17. Est. $100,000. Shreve, Lamb & Harmon, 11 W. 44 St., Zone 18, archts.

Tex., Port Lavaca—City, F. M. Dudgeon, mayor, City Hall, 2 story quick freeze plant, rein.-con., hollow tile, force account. Approx. $200,000. Garrett Engineering Co., 1306 Miam St., Houston, engrs. CD 11/15—ENR 11/16.

INDUSTRIAL BUILDINGS

PROPOSED WORK

★ **Ark., Little Rock** — PLANT — Arkansas Power & Light Co., C. H. Moses, pres., Simmons Natl. Bank Bldg., Pine Bluff, power generating plant, near here. $3,000,000.

Conn., Derby—FACTORY—Sponge Rubber Products Co., Howe Ave., revising plans, 1 story, brick, steel factory. $75,000. Bids 11/28 rejected. L. F. Caproni, 1221 Chapel St., New Haven, engr. CD 11/22—ENR 11/30.

Conn., Norwalk—FACTORY—Norwalk Tire & Rubber Co., Winnipauk, Norwalk, soon let contract, 2 story, 80x100 ft., rein.-con., brick factory, Winnipauk Station. $60,000. Fletcher Thompson, Inc., 211 State St., Bridgeport, engr CD 1/2—ENR 1/4.

Ia., Ottumwa — FOUNDRY — C. Leedom, Ottumwa Foundry, Ottumwa, plans by D. Morgan, Farmer & Merchant Bank Bldg., Burlington. 40x238 ft., concrete block facing, dry. $50,000. Beling Engineering Co., 15 St., Moline, Ill., engr.

Md., Taneytown—WAREHOUSE—Feesers Canning Factory, Taneytown, rebuilding warehouse sections. $50,000.

★ **Mich., Detroit**—PLANT—DeSoto Div., Chrysler Corp., 8000 Wyoming Ave., brick, steel, concrete plant mfg. cradles and motor mounts. $881,500.

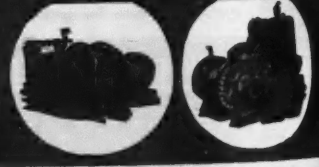
★ **Minn., Brainerd**—CAR REPAIR SHOP—Northern Pacific Ry. Co., B. Blum, chief engr., 176 E. 5 St., St. Paul, Minn., soon let contract, erecting superstructure of car repair shops, 180x575 ft. main bldg., 100x175 ft. brick, steel, concrete material warehouse, etc. $1,500,000. Toltz, King & Day, 10 Pioneer Bldg., St. Paul, engrs.-archts. W. Wheeler, 802 Metropolitan Life Bldg., Minneapolis, structural engr. CD 1/3—ENR 1/11.

★ **Minn., St. Paul**—PLANT—Trautman International Artificial Limb Co., C. J. Ward, pres., Brown & Bigelow, 1286 University Ave., plastic artificial limbs factory near Dunlap, Griggs and St. Anthony Ave. $1,000,000 or $2,000,000.

THOMAS HOISTS

FINEST QUALITY AT NO PREMIUM

THOMAS HOIST CO.
28 So. Hoyne Ave., Chicago, Illinois



"What Macwhyte PREformed Wire Rope means to me!"

MACWHYTE G-15 CATALOG

uick, easy handling . . . smooth, form spooling . . . long, economical rvice—those are some of the *plus* nefits I get from Macwhyte PRE-rmed," says the typical wire rope er.

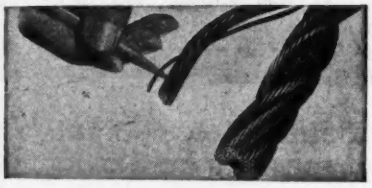
Why Macwhyte PREformed is preferred

ll wires and strands in a Macwhyte REformed rope are formed into a iral, so that they lie naturally in ce. Because it is free from internal ress, a Macwhyte PREformed rope s great fatigue resistance. Internal iction caused by wires and strands oving against each other is sharply duced, resulting in a minimum of ternal wear.

In Macwhyte PREformed, every rand in the rope is under uniform nsion. There is no "early" wearing ut of some strands while others oaf." The perfect balance of strands akes Macwhyte PREformed ex-ptionally kink resistant.

Other User Benefits

Macwhyte PREformed on your equipment means fewer shut-downs, less trouble. It is safer to use because it can be cut without seizing—broken strands won't wicker. The extreme flexibility of Macwhyte PREformed makes it hug the drum, reduces wear both on the wires and in the groove of the sheave. Because of its long life, Macwhyte PREformed gives lowest possible cost per load carried.



All this, and Macwhyte Internal Lubrication, too!

Every wire in every strand of Macwhyte PREformed rope is coated with Macwhyte internal lubricant to protect against moisture, rust and ordinary acids. Heavy and tenacious, it clings to the wires unaffected by temperature changes.

The demands of our armed services are so great now, there may be times when we cannot give you our usual prompt service and delivery. The situation changes from day to day, so please keep trying. We'll serve you if we possibly can.

MACWHYTE PREformed WIRE ROPE *Plus* Internal Lubrication Selected Steels, Tested-Proved

The correct rope for your equipment

MACWHYTE COMPANY

Wire Rope Manufacturers

ARMY E NAVY

2930 FOURTEENTH AVENUE KENOSHA, WISCONSIN

Mill Depots: New York • Pittsburgh • Chicago • Fort Worth • Portland • Seattle • San Francisco. Distributors throughout the U.S.A.

MACWHYTE PREformed and Internally Lubricated Wire Rope · MONARCH WHYTE STRAND Wire Rope · MACWHYTE Special Traction Elevator Rope · MACWHYTE Braided Wire Rope Slings · MACWHYTE Aircraft Cables and Tie-Rods · MACWHYTE Stainless Steel Wire Rope · MACWHYTE Monel Metal Wire Rope

MALL Tools illustrated above are Model 80 Circular Electric Saw 8" blade 2½" cutting capacity, also 12" blade and 4½" capacity. 1½ H.P. Gasoline Powered Concrete Vibrator also available with 3 H.P. round base or wheelbarrow mounting as well as 1½ H.P. Universal Electric and Pneumatic models. Pneumatic Chain Saw, also Gasoline Engine models, can be furnished in many cutting capacities.

Write direct for literature and prices.

MALL TOOL COMPANY, 7757 South Chicago Ave., Chicago 19, Ill.

Mall PORTABLE POWER TOOLS

WATER *is no Obstacle . .*
WITH 'COMPLETE' WELLPOINTS

★ ★ **GROUND WATER — the first hurdle the construction engineer must lick—is merely routine step number one, if patented *"Complete"* Wellpoints are on the job.**
Sale or Rental. Call *"Complete"* and forget your water problems.
2 to 5 Stage Jetting Pumps Available.

COMPLETE MACHINERY & EQUIPMENT CO. INC.
Long Island City 1, N. Y.
BRANCH WAREHOUSE—Gary, Ind.

ALCO

Electric Welded Steel Pipe — *FOR PERMANENT INSTALLATIONS*
Easy to Install · · High Capacity · · Dependable · · Long-lasting

American Locomotive
ALCO PRODUCTS DIVISION
30 Church Street, New York 8, N. Y. · Dunkirk, N. Y.

INDUSTRIAL BUILDINGS (Proposed Work Cont'd.)

Mo., St. Louis—PLANT—Fruehauf Trailer Co., 2122 Chouteau Ave., Zone 3, brick, rein.-con. trailer plant on 5-acre tract fronting 628 ft. on east line of Vandeventer Ave. and 351 ft. on north line of Market St. $250,000.

Mo., St. Louis—REPAIR, SERVICE AND SALES—Joe Lennemann, Inc., 5841 Delmar Blvd., Zone 8, brick, rein.-con. automobile repair, service and sales bldg., on site fronting 135 ft. on north side of Delmar Blvd. by depth of 157 ft. west of Goodfellow Blvd. $80,000. Site purchased.

Okla., Muskogee—PLANT—H. B. Egan Mfg. Co., Muskogee, 1 story, 65x90 ft., and 50x60 ft., brick, steel plant addns., improve existing bldg. J. F. Mumper, 412 Everett Bldg., Akron, O., engrs.

Pa., Bensalem (Phila. P. O.)—DAIRY FARM—Friends Hospital, H. T. Prentice, bus. mgr., Adams Ave. and Roosevelt Blvd., Phila., rebuilding dairy farm bldgs. $154,000.

Pa., Lower Merion Twp.—LABORATORY—Sharples Corp., W. E. Cox, secy.-treas., 23 and Westmoreland Sts., Phila., completed sketches by E. L. Pederson, co. archt., 1 story, masonry laboratory. $250,000.

Pa., Marcus Hook—LABORATORY—General Chemical Co., 40 Rector St., New York, N. Y., soon lets contract laboratory, Baker and Adamson Works. $50,000. O. Fisher, 154 Nassau St., New York, N. Y., engr.-archt. CD 1/31—ENR 2/8.

Pa., Phila. — BAKERY — Fleischmann's Vienna Model Bakery Co., D. C. Wiley, pres., 21 and Arch Sts., soon lets contract bakery addn. $40,000. Steele-Pownall & Gehrhardt, Inc., 1316 Arch St., engr.

Tex., Brookshire—FOOD LOCKER—Waller Co. Food Locker, c/o H. B. Guiberson, engr., 366 Blevins St., Fort Worth, rejected bids Jan. 24, 1 story frozen food locker plant, etc., brick, concrete. $40,000. May revise plans and readvertise. CD 1/16—ENR 1/18.

Tex., El Campo—PLANT—R. Raun, El Campo, silo type rice drying plant, rein.-con. Over $40,000. Central Engineering Co., 1210 Texas Ave., Houston, engr. (**Correction**—name of owner.) CD 11/8—ENR 11/16.

Tex., Hempstead—PLANT—San Bernard Electric Cooperative, Bellville and c/o H. B. Guiberson, engr., 366 Blevins St., Fort Worth, rejected bids 1 story frozen food locker plant, brick, rein.-con. $50,000. May revise plans and readvertise. CD 2/9—ENR 2/15, under LB.

Tex., Houston—PLANT—Houston Oil Field Materials Co., 1524 Maury St., converting chemical plant into shell mfg. plant. $110,000. H. Moore, 2008 W. Alabama St., engr.

Tex., Houston—PLANT—Owner, c/o Central Engineering Co. ,engr., 1210 Texas Ave., will not construct rice drying plant, rein.-con. $175,000. (**Correction**—name and address of engineer.) CD 11/29—ENR 12/7.

Tex., Houston — GARAGE — Houston Oil Field Materials Co., 1524 Maury St., plans by H. Moore, 2008 W. Alabama St., 1 story, brick, clay tile, concrete garage. $90,000.

Tex., McAllen—PLANT—Rio Sun Co., McAllen, 1 and 2 story citrus and vegetable processing plant, steel, rein.-con. $75,000.

Tex., New Braunfels — MILL — McGaugh Hosiery Co., New Braunfels, soon lets contract hosiery mill unit, masonry, structural steel, rein.-con. $60,000. R. Swarthout, New Braunfels, archt.

Tex., Raymondville — PLANT — Willacy County Chronicle, Raymondville, bids soon newspaper plant. $50,000.

Tex., Port Arthur — PLANT — American Rice Growers Assn., 7500 Washington St., Houston, will not construct, silo type rice drying plant, rein.-con. Over $40,000. Central Engineering Co., 1210 Texas Ave., Houston, engrs. (**Correction**—status.) CD 11/8—ENR 11/16.

Tex., Sour Lake—PLANT—American Rice Growers Assn., 7500 Washington St., Houston, will not construct, silo type rice drying plant, rein.-con. $70,000. Central Engineering Co., 1210 Texas Ave., Houston, engrs. (**Correction**—status.) CD 11/8—ENR 11/16.

Wis., Poynette—WAREHOUSE—Oconomowoc-Poynette Canning Co., Poynette, plans by J. J. and T. H. Flad, 133 Langdon St., Madison, 1 story 60x160 ft., frame warehouse, concrete fdn.

BIDS ASKED

Bids Asked After February 18

Conn., Norwich—FACTORY—U. S. Finishing Co., Greenville, Norwich, brick factory addn., alterations. Over $40,000. Lockwood Greene Engineers, Inc., 10 Rockefeller Plaza, New York 20, N. Y., engrs. CD 1/23—ENR 1/25.

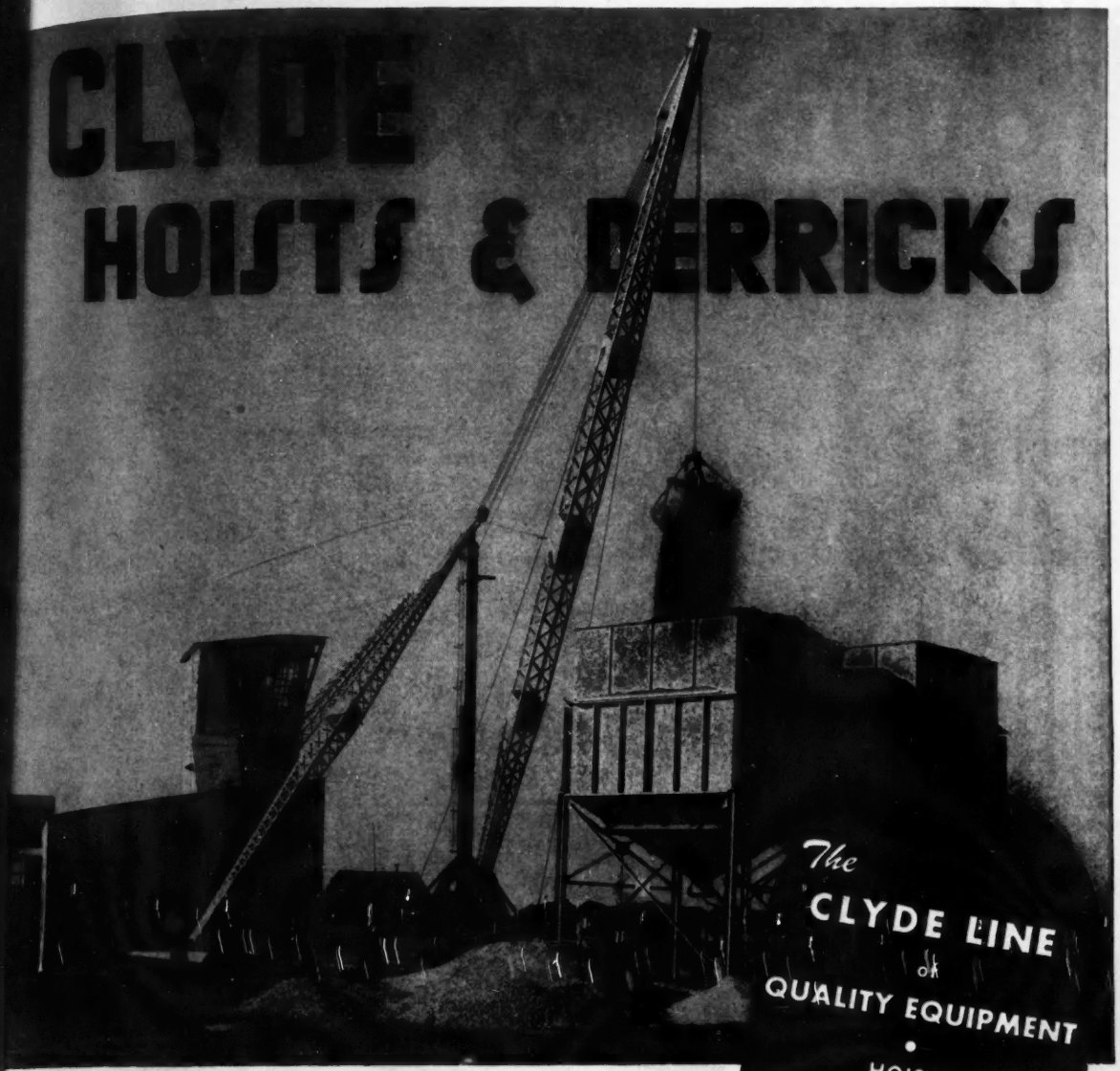
Bids Asked

Conn., West Haven—FACTORY—A. F. Holden, 52 Richards St. (selected list bidders), brick, steel factory, Richards St. Over $40,000. L. F. Caproni, 1221 Chapel St., New Haven, engr. CD 1/16—ENR 1/18.

Okla., Wynne Wood—REFINERY—Kerlyn Oil Co., 1st National Bldg., Oklahoma City, imprv., expanding capacity refinery plant. $125,000. CD 2/8—ENR 2/15.

★ **Pa., McKees Rocks**—PLANT—Continental Can Co., 100 E. 42 St., New York, W. F. Lenhart, plant supt., Monson Ave., McKees Rocks, forge shop. $750,000. J. Fedosky, 6501 W. 65 St., Chicago, Ill., temporarily c/o owner, McKees Rocks, engr. CD 1/4—ENR 1/11.

CLYDE HOISTS & DERRICKS



The CLYDE LINE of QUALITY EQUIPMENT

- HOISTS
- DERRICKS
- WHIRLEYS
- CAR PULLERS
- HAND POWERS
- BUILDERS TOWERS
- MINE HOISTS
- WINDLASSES
- WINCHES
- PILE DRIVERS
- BARGE & DREDGE MACHINERY

A complete line of modern equipment specially designed to meet the requirements of all types of material handling operations.

Clyde hoists and derricks are built to provide the utmost in safe, efficient and economical operation. Every part is accurately designed for the duty it is to perform to assure long and dependable service.

Bulletins giving construction details and complete information on Clyde equipment are available upon request. Write for your copies.

CLYDE

CLYDE IRON WORKS, INC.
DULUTH, 1 MINNESOTA

FOUNDATIONS

PRETEST UNDERPINNING
CONCRETE-STEEL PILES
MASS CONCRETE CONSTRUCTION
HEAVY SHORING
DRILLED-IN CAISSONS

Send for catalogs descriptive of the latest foundation types and methods

SPENCER, WHITE & PRENTIS, INC.
10 EAST 40th ST. NEW YORK 16, N. Y.

Outdoor Water Service Devices

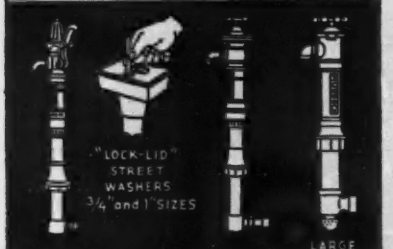
That are anti-freezing.
That don't give trouble.
That require only an occasional rewashering (done without digging up fixture).

"It pays to buy Murdock."

Write for Catalog "L."

MURDOCK MFG. & SUP. CO.
426 Plum St.,
Cincinnati 2, O.
Since 1853

MURDOCK



Blueprint Now!
PITTSBURGH • DES MOINES

ELEVATED STEEL TANKS

Pittsburgh-Des Moines welcomes the opportunity of offering your community complete engineering and technical planning assistance—without obligation. Write Pittsburgh-Des Moines today.

PITTSBURGH-DES MOINES STEEL COMPANY

Pittsburgh, Pa. . . . . 3414 Neville Island
Des Moines, Ia. . . . . 915 Tuttle Street

INDUSTRIAL BUILDINGS (Bids Asked; Cont'd.)

R. I., Cranston—MILL FOUNDATIONS, etc.—Atlantic Tubing & Rubber Co., G. P. Smith, in charge, Mill St., foundations, ramming, erection for 85 in. rubber mills, large presses and calenders, Mill St.

Tex., Katy—PLANT—Dow Chemical Co., Freeport, and M & M Bldg., Houston, metering and filtering bldg., facilities, $50,000. CD 11/28—ENR 11/30.

Tex., Houston—PLANT—Uvalde Rock Asphalt Co., 1705 Oliver St., 1 story, steel plant, concrete fdn. $48,000. N. Gatoura, Electric Bldg., engr. CD 1/31—ENR 2/8.

★**Wyo., Cowley**—PLANT—General Petroleum Corp., Cowley, skimming plant, $750,000; crude oil loading racks, facilities, $75,000. CD 2/8—ENR 2/15.

CONTRACTS AWARDED

Calif., Ontario—PLANT—California Fruit Growers Exchange, 616 E. Grove Ave., 1 and part 2 story fruit juice extraction plant, 100x340 ft., rein.-con., 616 E. Grove Ave., to C. T. & W. P. Stover, 116 N. Alexander Ave., Claremont, approx. $400,000.

Calif., Wilmington—REFINERY BOILERS—Shell Oil Co., 1008 W. 6 St., Los Angeles, installing 2 boilers for steam generation at Dominguez Section of Owner's Wilmington Refinery, to Oilfield Constr. Co., 2650 Cherry Ave., Long Beach, approx. $195,000.

Colo., Denver—ICE STORAGE—Burlington Refrigerator Express Co., 1900 14 St., 50x85 ft. ice storage bldg., 41 ft. high, brick, concrete, to Thos. Bate & Sons Co., 2311 10 St. Est. $50,000. W. Gordon Jamieson, 818 12 St., archt.

Del., Dover—PLANT—R. O. Dulaney, Fuitland, Md., frozen food plant addn., to Consolidated Engr. Corp., 20 E. Franklin St., Baltimore, Md., $50,000. CD 1/31—ENR 2/8.

Fla., Dunedin—WAREHOUSE—Citrus Concentrates, Inc., Dunedin, 1 story, 132x148 ft. warehouse, to Paul Smith Constr. Co., 310 N. Rome Ave., Tampa, $140,000. E. W. Nicholson, Dunedin, archt.

★**Fla., Sarasota**—POWER PLANT—Florida Power & Light Co., Ingraham Bldg., Miami, power plant, near here, separate contracts. $2,000,000. H. V. Street, c/o owner, engr. Ebasco Services, Inc., 2 Rector St., New York, N. Y., engrs. CD 11/15—ENR 11/30, under Post-war Projects.

Ill., Chicago—FACTORY—Heick Die Casting Co., 4061 W. Schubert St., masonry and carpentry contract 1 story, 60x141x244 ft. brick factory, to Hope & Jorgensen, 3016 N. New England St. Est. $50,000. S. Kiefstad, 3600 W. Fullerton Ave., archt.

Ill., Chicago—FACTORY—Santay Corp., 351 N. Pulaski Rd., 2 story, 80x80 ft., brick factory, to J. Emil Anderson & Son, 1109 W. Balmoral St. Est. $60,000. A. M. Heda, 3312 E. Eastwood St., archt.

Ill., Moline—FACTORY—Herman Nelson Corp., 1824 3 Ave., 220x240 ft., concrete block, steel truss factory addn., 25 St. plant, to Priester Constr. Co., Davenport Bank Bldg., Davenport, Ia., over $200,000. W. L. Parish, 45 22 Jersey Ridge Rd., Davenport, Ia., archt.

★**Mich., Detroit**—PLANT—U. S. Rubber Co., 6600 East Jefferson Ave., brick, steel, concrete tire production plant, to O. W. Burke Co., 1001 Fisher Bldg., Zone 2. Est. $3,000,000 Lockwood Greene, Engineers, Inc., 10 Rockefeller Plaza, New York 20, N. Y., engrs. CD 1/8—ENR 1/11.

Mo., St. Louis—PLANT—Mallinckrodt Chemical Works, 3600 N. Second St., Zone 1, altering, imprv. chemical plant, incl. new floor slab, partitions, close openings and loading platforms at 3500 North Second St., to Dickie Constr. Co., Loudermann Bldg., 317 N. 11 St., Zone 1, approx. $50,000. Jamieson & Spearl, Arcade Bldg., 806 Olive St., Zone 1, archts.

Neb., York—PLANT, etc.—D. Sack, York State Bank, York, freezer bldg. and egg breaking plant, to O. L. Clark, York, approx. $250,000. A. Benberg, New York Life Bldg., Kansas City, Mo., archt. CD 10/16—ENR 10/19.

N. J., Jersey City—PLANT—Western Electric Co., 100 Central Ave., Kearney plant alterations, Claremont Ave., to Hugh A. Montague & Son, Inc., 880 Bergen Ave., $40,000.

Pa., Berwick—FACTORY—E. V. Wise, Adams Ave., rebuilding potato chip factory, to W. F. Sutter, 835 E. 2 St., Nescopeck, $150,000. Awarded 2/7. Lawrie & Green, 321 N. Front St., Harrisburg, archts.

Pa., Chester—FREIGHT STATION—Reading Co., E. Y. Allen, ch. engr., Reading Terminal, Phila., Zone 1, repairing Chester Freight Station, to Haverstick-Borthwick Co., 1505 Race St., Phila., $45,000. Awarded 2/7. CD 1/31—ENR 2/8.

Pa., Scranton—PLANT—Kaiser Industries, Inc., Fleetwing Div., Bristol, converting armory into shell plant, to Turner Constr. Co., 1500 Walnut St., Phila., $150,000. Awarded 2/5.

Tex., Austin—WAREHOUSE—Red & White Stores, 230 Dakota St., San Antonio, 1 story, 100x200 ft., concrete warehouse, to C. L. Browning, Jr., 812 Insurance Bldg., San Antonio, approx. $60,000. CD 2/7—ENR 2/15.

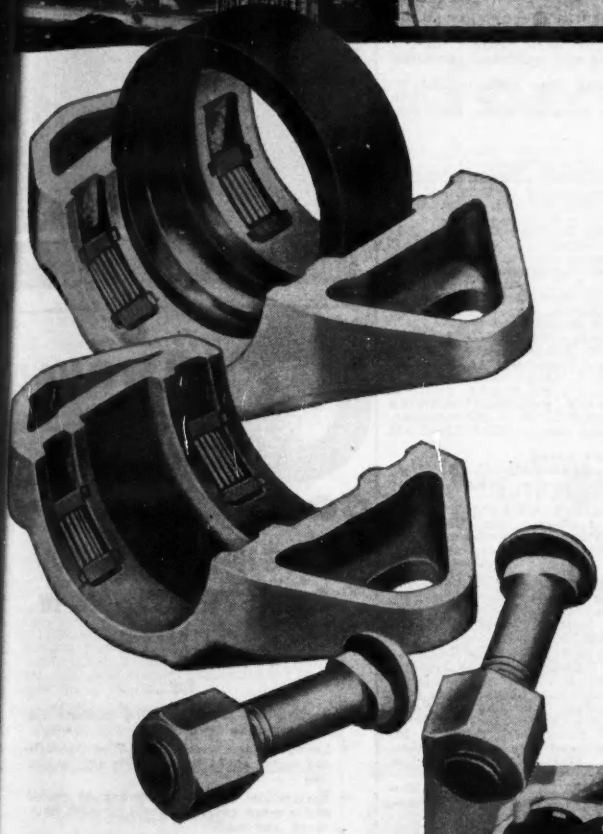
Tex., Texas City—AIR COMPRESSOR BLDG.—Pan-American Refining Co., Texas City, air compressor bldg., brick, rein.-con., force account. $40,000. CD 2/9—ENR 2/15.

"DAM THE FLOODS"
Says Congress In Passing Army Engineers' Reclamation Bureau Plan for Vast Postwar Missouri River Basin Development

ROLAGRIP
PIPE COUPLINGS

Will Play Important Time-Saving, Cost-Saving Role on All Types of Peacetime Construction Projects

Vital to speed and economy in construction projects are Rolagrip Pipe Couplings. Lightweight pipe can be used since threading, grooving or flanging are eliminated. Anyone who can handle a wrench can make the time-saving, leakproof connections. Gasket is simply slid over the two pipe ends, centered over the joint and the halves of the housing bolted together. No need for special tools or shopwork. Anchorage of the line is unnecessary. Repairs or line changes can be made quickly and safely with Rolagrips. Only plain end pipe, new or used, need be stocked.



100% RECLAIMABLE

In some uses, the pipe itself may wear through completely and have to be renewed, but it is not necessary to renew Rolagrip Pipe Couplings. They are completely salvaged and used on one job after another. In addition, their flexibility and shock resistance combine to make them ideal for temporary as well as permanent lines.

G·B MFG. CO
ESTABLISHED 1898

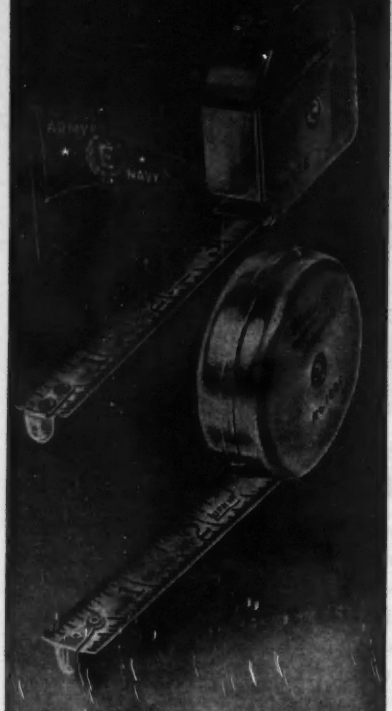
ARMY E NAVY

GUSTIN-BACON MFG. COMPANY
KANSAS CITY 7, MISSOURI

New York • Philadelphia • Chicago • Tulsa • Houston • Fort Worth • San Francisco

LUFKIN

TAPE RULES THAT EVERY ENGINEER SHOULD HAVE



Every busy engineer needs a Lufkin Measurall or Wizard Jr. steel tape rule for his vest pocket—where it's handy and ready for those dozens of little measuring jobs that come up every day.

Ideal for general measuring work—inside, outside, height or depth. They're accurate for both hook or butt end measurements. Six feet long, they remain rigid when extended yet will wrap around corners or curves with ease. Write for free catalog.

BUY THROUGH YOUR DISTRIBUTOR

LUFKIN

SAGINAW, MICHIGAN • New York City

TAPES • RULES • PRECISION TOOLS

INDUSTRIAL BLDGS. (Contracts Awarded, Cont'd.)

Wash., Seattle—FOUNDRY—Seattle Brass Co., 4047 7 Ave. S., Zone 8, 1 story, 60x120 ft., steel frame and masonry foundry, to The Austin Co., 16112 Euclid St., Cleveland, O. Est. $50,000.

UNCLASSIFIED

PROPOSED WORK

★**Calif., Upland**—AIRPORT—E. A. Riley, Upland, private airport between Campus Ave. and East city limit, 15 to 16 Sts., hangar, administration bldg., 250x300 ft. runways. Over $500,000. City Planning Comm. has approved, CAA approval being sought.

Conn., New Haven—COAL TERMINAL—Seaboard Coal Co., 24 River St., reconstructing coal terminal, coal pockets, etc. $45,000.

Ill., Madison — SWIMMING POOL — The Swimming Pool Assn. of Madison, R. Johns, pres., plans by Knoebel & Pabst, c/o W. G. Knoebel, 605 Greenwood Pl., Collinsville, 50x150 ft., rein.-con. swimming pool, $35,000. Site purchased.

★**Kansas** — PIPELINE — **Kansas Power & Light Co.**, 401 Kansas St., Topeka, 25.8 mi. gas pipeline, gasoline recovery and dehydration plant. $796,799.

★**Louisiana and Mississippi** — OIL PIPELINE—Interstate Pipe Lines, c/o Oklahoma Pipe Line Co., National Bank Tulsa Bldg., Tulsa, Okla., and Standard Oil Co. of Louisiana, 1539 Jackson Ave., New Orleans, La., 8, 10 and 12 in. crude oil pipeline carrier feeder loops from points in lower Mississippi and Louisiana areas. $2,500,000. CD 10/16—ENR 10/19.

†**Mo., Eldon**—AIRPORT, etc.—City, R. L. Reed, mayor, City Hall, voted $25,000 bonds, municipal airport and park project, incl. 2 flight strips, lighting and servicing facilities, etc. $114,500. CAA.

†**Tex., Camp Maxey (br. Paris)**—TRAINING AIDS, etc.—U. S. Eng., 331 W. Main St., Denison, army training aids, facilities. $125,000.

BIDS ASKED

Bids Asked After February 16

†**Tex., Houston**—INSTRUMENT LANDING SYSTEM—Civil Aeronautics Admin., P. O. Box 1689, Fort Worth, Zone 1, instrument landing sys.

Bids Asked February 27

New York — SURFACE RAILROAD TRACKS—Bd. Transportation, 250 Hudson St., New York, Zone 13, renewal of surface railroad tracks of N.Y.C. Transit Sys., BMT Div. in Metropolitan Ave. from 69 St. to Dry Harbor Rd., Queens, Agreement "RR".

Bids Asked About March 2

★**Calif., Long Beach**—WHARF—City Harbor Dpt., 1333 El Embarcadero, 72x2500 ft., rein.-con. wharf imprvs., at Pier A, Berths 4, 5, 6 and 7, fdns., utilities for 3 future transit sheds, 5½ mi. tracks, grading, paving electrical work, rein.-con. retaining walls, etc. Over $500,000. R. R. Shoemaker, 1333 El Embarcadero, engr. CD 7/13—ENR 7/20.

Bids Asked

†**N. M., Roswell**—HANGAR—U. S. Eng., P. O. Box 1538, Albuquerque, hangar. Over $40,000. CD 11/13—ENR 11/16.

Pa., Phila.—AIRPORT GRADING, etc.—City, Dpt. P. Wks., J. Neeson, dir., City Hall Annex, paving, grading, roadwork at Northeast Airport. $30,000. T. Buckley, city engr.

LOW BIDDERS

†**Ariz., Tucson**—HANGAR—U. S. Eng., 751 S. Figueroa St., Los Angeles 14, Calif., Feb. 12, hangar bldg. at Davis-Monthan Field, No. 81, from A. C. LaRue Constr. Co., 3114 N. Campbell St., $148,907.

Calif., East Los Angeles (br. Los Angeles)—PARK DEVELOPMENT, etc.—Los Angeles Co., Los Angeles, Feb. 6, partial development East Los Angeles Park and playground, 4800 Anaheim-Telegraph Rd., Los Angeles, Spec. 720, waterlines, sewer line, concrete drive and walks, flagpole, fence, etc., from N. M. Calhoun, 845 N. Highland Ave., Los Angeles. $25,827. A. Jones, Hall of Records, Los Angeles, engr.

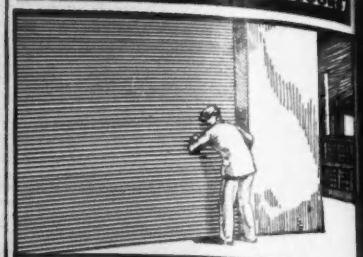
†**Conn., Stratford**—LIGHTING SYSTEM—U. S. Eng., 31 St. James Ave., Boston, Mass., Feb. 13, lighting sys. airport, No. 19-023-45-Neg-33, from Wilan, Inc., 2569 White Plains Ave., New York, N. Y., $37,809. CD 2/9.

†**La., St. Pose**—RADIO RANGE—Civil Aeronautics Admin., 84 Marietta St. N.W., Atlanta, Ga., Feb. 12, dismantling radio range facility, incl. 5 steel towers, underground conduits, prefabricated bldg., etc., in New Orleans, and re-erecting same on site, near here, from Soule Bros. Constr. Co., 2100 N.E. St., Pensacola, Fla., $43,000. CD 2/2.

†**Tex., Biggs Field (br. El Paso)**—HANGAR—U. S. Eng., P. O. Box 1538, Albuquerque, N. M., Hang-A-R type hangar, from C. H. Leavell, Bassett Tower, $139,813. CD 2/5—ENR 2/8.

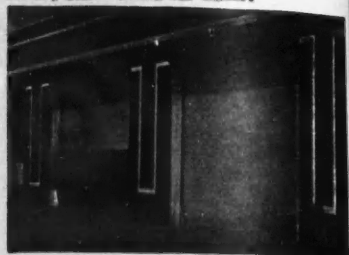
★†**Tex., Randolph Field**—APRONS, etc.—U. S. Eng., Fort Sam Houston, Feb. 13, 240,000 sq. yd. heavy duty concrete aprons, access taxiway with 12½ ft. shoulder, 75 ft. widths asphalt shoulder for two 7,000 ft. runways, widening 4 taxiways 100 ft., extend. parallel runways, widening 4 taxiways, relocating, paving road, constructing control

SAVING WASTE IN DOORWAYS KINNEAR ROLLING DOORS



5 BARRIERS AGAINST THEFT!

When Kinnear Rolling Doors are closed and locked, they barricade openings against intruders with a "solid" wall of steel (the rugged interlocking-steel slat curtain). And the proved economy and convenience of their space saving upward action are among the 14 other major advantages of Kinnear Rolling Doors. Easy to install, too! Write for details!



THE KINNEAR MANUFACTURING CO.
1820-40 Fields Ave. Columbus 16, Ohio

NATIONAL GUNITE CORPORATION

ENGINEERING and CONSTRUCTION in GUNITE

for

- Restoration and rebuilding concrete and masonry dams.
- Lining tuberculated and spalled penstocks and water mains to renew life and increase flow.
- Restoration and strengthening of spalled and eroded concrete docks, bridges, abutments and walls.
- Restoration of spalled, disintegrated and fire-damaged concrete buildings.
- Lining for tunnels, mines and rock cuts.
- Lining for steel bins and hoppers.
- Lining for sewers.
- Thin curtain walls.
- Swimming pools.
- Refractory linings for stacks and breechings.
- Pneumatic backfilling.

Our Engineers are available for consultation

NATIONAL GUNITE CORPORATION

420 Lexington Avenue, New York 17, N. Y.
101 West Dedham Street, Boston 18, Mass.
310 Bond Building, Washington 5, D. C.
Rhodes-Haverty Bldg., Atlanta 3, Ga.

LASSIFIED (Low Bidders, Cont'd.)
15 ft. wide taxiways, outside night
ng sys. for airfield areas, grounds de-
ng, seeding, etc., foregoing Serial
ment, from M. E. Killian &
W-41-154-45-74, from M. E. Killian &
nd E. B. Darby Co., P. O. Box 1981,
Antonio, $2,039,221. CD 1/30—ENR 2/1.
Bakersfield — PLANE PARKING
s, etc.—Yards & Docks, Navy Dpt., 18
nd Constitution Ave. N.W., Wash. 25,
Feb. 14, addnl. plane parking area
Spec. 16714, NOY 11399, from
Russell, Central Natl. Bank Bldg.,
nond, $21,705.
Seattle—GRADING, etc.—U. S.
Ave., Zone 4, Feb. 10, grading,
for reconstructing taxiway Boeing
Nov. 1089, from Northwest Constr.
Ave. N.W., Zone 7, $51,795.

CONTRACTS AWARDED

Calif., Alameda—FIRE WALL—Yards &
Navy Dpt., 18 St. and Constitution
N.W., Wash 25, D. C., fire wall, Naval
Station, Spec. 14115, NOY 11400, to
Williams Co., 10 California Dr., Bur-
$48,550. Bids 1/25.
Calif., Muroc—AIRFIELD BLDGS., etc.—
Eng., 751 S. Figueroa St., Los Angeles,
roads at Material Flight
14, bldgs.
Base, No. 237, to J. F. Cummins, 245
Olive Ave., Burbank, approx. $60,000.
Granite City—SPRINKLER SYSTEMS
Eng., 816 U. S. Courthouse & Cus-
St. Louis 2, Mo., installing auto-
house,
sprinkler sys. in Warehouses 1 to 5
(inclusive), and Bldgs. T-332 and T-333,
air compressors, control valves, sprink-
heads, excav., masonry, pipework, elec-
work, Neg. 23-065-45-83, to Automatic
kler Corp. of America, 2920 Lindell
St. Louis 3, Mo. $239,542. Bids 1/30.
Gulfport—HANGARS—U. S. Eng.,
St., west of Westwood St., Mobile,
hangars, to R. P. Farnsworth & Co.,
Calcode St., New Orleans, La.
J., Camden—BOAT SLIP, etc.—New
Shipbuilding Corp., Bway and Fairview
boat slip and shipway repairs, own
$85,000.
Klamath Falls—AIR STATION
FACILITIES, etc.—Yards & Docks,
Dpt., 18 St. and Constitution Ave.
Wash. 25, D. C., water supply lines,
Air Station, NOY 11581, to Grinnell
of the Pacific, 3101 Elliott Ave., Seattle
Wash. $37,914, CD 1/30; sprinkler sys. in
gar, NOY 11582, to P. S. Lord, 4507 S.E.
waukee Ave., Portland, Zone 2, $67,712,
1/30.
Texas — TRANSMISSION LINE — Central
er & Light Co., Corpus Christi, 88 mi.
00 volt power transmission line, Kleberk,
llacy, Cameron and Kennedy Counties,
ve account. Approx. $90,000. CD 2/6—
R 2/8.
Wash., Tacoma—PIER IMPROVEMENTS
Northern Pacific Ry. Co., B. Blum, ch.
r., 176 E. 5 St., St. Paul, Minn., pier
rvs., at Commercial dock, incl. 8 ft. plat-
m with concrete retaining wall, asphaltic
crete wearing surface, asphaltic concrete
r, etc., to Hart Constr. Co., 2534 E. 11
Est $140,000.
Nev., Hawthorne—AIR CONDITIONING
Yards & Docks, Navy Dpt., 18 St. and
nstitution Ave. N.W., Wash. 25, D. C., air
nditioning permanent inhibiting bldg.,
yal Ammunition Depot, NOY 11504, to
Conditioning Co. of Southern California,
Santa Fe Ave., Los Angeles 21, Calif.
1,500. Former contract rescinded, CD
19—ENR 12/21, under CA.
I., Newport—GAS STORAGE TANK—
wport Gas Light Co., 181 Thames St.,
,000 cu. ft. steel gas storage tank, on
ames St., to Chicago Bridge & Iron Co.,
Bway., New York, N. Y., $35,000.
N. S., Halifax—WHARF SERVICES, etc.—
t. National Defense (Sea), Ottawa, Ont.,
harf services, and Rectifier Bldg. 47, H.M.C.
ckyard, to Foundation Maritime, Ltd.,
Lower Water St., $43,151.

Proposal Advertisements see p. 168
Postwar Projects see p. 114

DRILLING CONTRACTORS
DIAMOND AND SHOT CORE BORINGS—DRY SAMPLE BORINGS
Foundation Testing for Bridges, Dams and All Heavy Structures
Also
Manufacturers of Diamond and Shot Core Drills, Accessories and Equipment
SPRAGUE & HENWOOD, Inc.
SCRANTON, PA. Dept. E U. S. A.

...Power lifeline
for BIG DIGS
In wet excavating or dry, big diggers get power dependably when Okocord electric Shovel and Dredge cable is selected. Durable because ruggedness has been built into every component, Okocord withstands the jagged edges of rock and shale when dragged across them . . . takes weather extremes in stride . . . does an equally good job whether hauled about on land or used in underwater service.
Okocord portable cords and cables are vulcanized in a continuous metal mold, and their Okoprene protective sheath resists moisture, oil, chemicals, ozone, heat, sunlight, flame and weather conditions. The Okonite Company, Passaic, New Jersey.
OKONITE
Insulated wires and cables

Okocord portable power cables—sizes 8AWG to 500,000CM, single or multiple conductor—are available for service up to 15,000 volts in a number of designs with or without ground wires and with or without shielding. Can be supplied with moisture-proof molded terminals.

UNDERPINNING & FOUNDATION CO., INC.
ENGINEERS & CONTRACTORS
Hercules Piles — Caissons — Cofferdams
Arresting of Foundation Settlement
Shafts — Tunnels — Subways — Excavations
Bulkhead — Piers — Shipways — River Work
Engineering Construction of All Types
NO PROJECT TOO LARGE—NONE TOO SMALL
155 East 44th Street New York 17, N. Y.

THE MOST FOR THE MONEY — SPEED · EFFICIENCY · ECONOMY

CONSTRUCTION BY CONTRACT

THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA, INC. · MUNSEY BLDG. WASH. D.C.

Bids: Feb. 28 (343)

Bridge Structure

MISSISSIPPI RIVER HIGHWAY BRIDGE
AT MEMPHIS, TENNESSEE—
CRITTENDEN COUNTY, ARKANSAS
MAIN BRIDGE SUBSTRUCTURE
PROJECT NO. SN-A-SN-U-FAP 607-A(2),
PART 1.

TENNESSEE—ARKANSAS

Sealed duplicate proposals will be received by the Department of Highways and Public Works of Tennessee and the Arkansas State Highway Commission, jointly, at Room 107, Courthouse at Memphis, Tennessee, until 10:00 a. m. Central War Time on February 28, 1945, for the construction of Tennessee-Arkansas Project No. SN-A-SN-U-FAP 607-A(2), Part 1 consisting of the Memphis abutment and the seven main piers of a highway bridge over the Mississippi River, between Memphis, Tennessee, and Crittenden County, Arkansas, and will be publicly opened and read immediately thereafter in the City Council Chamber in the Courthouse, Memphis, Tennessee.

The work to be performed under this contract will consist principally of the construction on the Memphis bank of a stone-faced abutment anchorage and connecting retaining walls, the construction of four pneumatic caisson founded stone-faced main river piers in the navigable section of the river, and the construction of three caisson founded stone-faced piers on the Arkansas bank, all of which support the main superstructure over the Mississippi River, as shown on the contract plans.

Bidders will be required to file with their bids duplicate financial, equipment and experience questionnaire forms made out in detail, which forms will be furnished with bid blanks.

A bidder's bond in duplicate in the amount of $250,000, payable jointly to the Department of Highways and Public Works of Tennessee and the Arkansas State Highway Commission on the forms furnished with the proposal, will be accepted by the States only from a surety or sureties qualified to do business both in Tennessee and Arkansas and holding certificates of authority from the United States Treasury Department and conforming to the limitations of the last published Treasury statement on acceptable sureties.

Plans, specifications and contract documents, together with forms, questionnaires and necessary information, are open to public inspection at the offices of the Department of Highways and Public Works of Tennessee, Nashville, Tennessee, and the Arkansas State Highway Commission, Little Rock, Arkansas, and of Modjeski and Masters, Engineers, State Street Building, Harrisburg, Pennsylvania, and at Room 107, Courthouse, Memphis, Tennessee, and may be secured from Modjeski and Masters, Engineers, State Street Building, Harrisburg, Pennsylvania, upon a deposit of $20.00 per set.

A refund of $10.00 per set will be made by Modjeski and Masters upon the return in good condition to them of the copy so obtained.

The opening of bids is contingent on authorization by the War Production Board of beginning of construction, together with the granting of the preference ratings and allotments of critical materials for the work. If such authorization is not issued by the time specified for the opening of bids, all proposals will be returned unopened to the respective bidders.

No bid may be withdrawn after having been deposited or filed.

The right is reserved to reject any or all bids and to waive all technicalities.

DEPARTMENT OF HIGHWAYS AND
PUBLIC WORKS OF TENNESSEE
C. W. PHILLIPS, Commissioner.
ARKANSAS STATE HIGHWAY
COMMISSION
J. H. CRAIN, Chairman.

Bids: March 26 (338)

Building Reinforcing and Office Renovating

MERRIMACK MANUFACTURING COMPANY, HUNTSVILLE, ALABAMA

Sealed proposals will be received and privately opened in the office of J. E. Sirrine & Company, Greenville, South Carolina, at 10:00 a.m., Eastern War Time, on Tuesday, March 20, 1945, for: 1) *General Reinforcing of Mill No. 2*, consisting of building 31 reinforced-concrete buttresses and stiffening existing wooden floor beams by bolting to them approximately 160 tons of structural-steel channels; and 2) *Office Renovating*, consisting of general revamping of the existing building.

Bids shall be enclosed in a sealed envelope addressed to J. E. Sirrine & Company, Greenville, South Carolina, and shall be plainly marked on the outside of the envelope: "Proposal for Building Reinforcing and Office Changes, Merrimack Manufacturing Company."

Plans and specifications are open to public inspection at the office of the Engineers, J. E. Sirrine & Company, or they may be obtained from the Engineers upon deposit of $15.00 for the Building Reinforcing plans and $10.00 for the Office Renovating plans. If all documents are returned in good condition within fifteen days after date set for opening of bids, the full amount of the deposit will be refunded to each General Contractor who submits a bona fide bid. If the documents are not returned within the stipulated time, or if the General Contractor does not submit a bona fide bid, the deposit will not be refunded.

It is estimated that the total cost of the work will be approximately $90,000.00.

The Owners reserve the right to accept any bid or reject any or all bids and to waive all technicalities in the receiving of proposals.

J. E. SIRRINE & COMPANY

WHERE TO BUY
Featuring additional products, specialties, and services for the Construction Industry

IMMEDIATE DELIVERY
UNIVERSAL Level-Transit
Telescope 12" long, 25 power—Horizontal Circle 4½" with vernier to 5 minutes—Vertical Arc 5"—Clamp and Tangent Screw for Vertical and Horizontal Limb—Instrument weighs 11 pounds, tripod 9 pounds.
Price complete with Tripod, Carrying Case, Sunshade, and Dust Cap $115.00. Can be furnished with a compass at $12.50 extra—Stadia Wires $5.00 extra.
ORDER BY MAIL
Expert Repairing of All Makes of Instruments
FREE INTERESTING BOOK—HOW TO LAYOUT BUILDING LOTS — WRITE TODAY
DAVID WHITE CO. 305 W. COURT STREET MILWAUKEE 12, WIS.

STEEL AND HEAVY WOOD
CONSTRUCTION AND HEAVY
RIGGING OF ALL TYPES.
Karl Koch Erecting Co. Inc.
362 Casanova St. Bronx 59, N. Y.
Dayton 9-7474

Let Us Write Your Contract Bonds
THE ÆTNA CASUALTY
HARTFORD
Agents From Coast to Coast
and SURETY COMPANY
CONNECTICUT

EN
NE
Plougastel